OCTOBER 11, 1951

IRON AGE

VOL. 168, NO. 15

CONTENTS

★Starred items are digested on opposite page.

THE IRON AGE
Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N. Y.

GEORGE T. HOOK, Publisher
TOM C. CAMPBELL, Editor

EDITORIAL STAFF

Managing Editor George F. Sullivan
Technical Editor Darwyn I. Brown
News-Markets Editor Wm. V. Packard
Machinery Editor George Elwers
Associate Editors: H. W. Van Camp, F. J. Winters, R. L. Hatschek, John Kolb, Ted Metaxas, W. B. Olson; Art Director: Carl Cerminaro; Regional Editors: E. C. Beaudet, Chicago; W. W. Taylor, Cleveland; W. G. Patton, Detroit; John B. Delaney, Pittsburgh; R. T. Reinhardt, San Francisco; George H. Baker, Karl Rannells, Ray M. Stroupe, Washington. Correspondents: Fred L. Allen, Birmingham; N. Levenson, Boston; Fred Edmunds, Los Angeles; James Douglas, Seattle; Roy Edmonds, St. Louis; F. Sanderson, Toronto; F. H. Harley, London, England; Chilton Editorial Board: Paul Wooton, Washington Representative.

BUSINESS STAFF

Production Manager B. H. Hayes
Director of Research Oliver Johnson
Mgr. Circul'n & Promotion C. T. Post
Asst. Promotion Mgr. James A. Crites
Asst. Dir. of Research Wm. Laimbeer

REGIONAL BUSINESS MANAGERS

B. L. Herman, Philadelphia; Stanley J. Smith, Chicago; Peirce Lewis, Detroit; Paul Bachman, New England; Charles R. Lippold, Cleveland; R. Raymond Kay, Los Angeles; C. H. Ober, New York; J. M. Spackman, Pittsburgh; Harry Becker, European Representative.

REGIONAL OFFICES

Chicago 3, 10 S. LaSalle St.; Cleveland 14, 1016 National City Bank Bldg.; Detroit 2, 103 Pallister Ave.; Los Angeles 28, 2420 Cheremoya Ave.; New England, 62 La Salle Rd., W. Hartford 7; New York 17, 100 E. 42nd St.; Philadelphia 39, 56th & Chestnut Sts.; Pittsburgh 22, 814 Park Bldg.; San Francisco 3, 1355 Market St.; Washington 4, National Press Bldg.; European, 111 Thorley Lane, Timperley, Cheshire, England.

Circulation Representatives: Thomas Scott, James Richardson.

One of the Publications Owned and Published by Chilton Co., Inc., Chestnut & 56th Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

Vice-Presidents: Everit B. Terhune, G. C. Buzby, P. M. Fahrendorf, Harry V. Duffy, William H. Vallar, Treasurer; John Blair Moffett, Secretary; Maurice E. Cox, George T. Hook, Tom C. Campbell, Frank E. Tighe, L. V. Rowlands, Directors. George Maiswinkle, Asst. Treas.

Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries, $25 per year. Single Copies 35c. Annual Review and Metal Industry Facts Issue, $2.00. Cable address "Ironage" N. Y.

Member

Audit Bureau of Circulations

Society of Business Magazine Editors

National Business Publications

OCTOBER 11, 1951

IRON AGE

VOL. 168, NO. 15

CONTENTS

★Starred items are digested on opposite page.

THE IRON AGE
Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N. Y.

GEORGE T. HOOK, Publisher
TOM C. CAMPBELL, Editor

EDITORIAL STAFF

Managing Editor George F. Sullivan
Technical Editor Darwyn I. Brown
News-Markets Editor Wm. V. Packard
Machinery Editor George Elwers
Associate Editors: H. W. Van Camp, F. J. Winters, R. L. Hatschek, John Kolb, Ted Metaxas, W. B. Olson; Art Director: Carl Cerminaro; Regional Editors: E. C. Beaudet, Chicago; W. W. Taylor, Cleveland; W. G. Patton, Detroit; John B. Delaney, Pittsburgh; R. T. Reinhardt, San Francisco; George H. Baker, Karl Rannells, Ray M. Stroupe, Washington. Correspondents: Fred L. Allen, Birmingham; N. Levenson, Boston; Fred Edmunds, Los Angeles; James Douglas, Seattle; Roy Edmonds, St. Louis; F. Sanderson, Toronto; F. H. Harley, London, England; Chilton Editorial Board: Paul Wooton, Washington Representative.

BUSINESS STAFF

Production Manager B. H. Hayes
Director of Research Oliver Johnson
Mgr. Circul'n & Promotion C. T. Post
Asst. Promotion Mgr. James A. Crites
Asst. Dir. of Research Wm. Laimbeer

REGIONAL BUSINESS MANAGERS

B. L. Herman, Philadelphia; Stanley J. Smith, Chicago; Peirce Lewis, Detroit; Paul Bachman, New England; Charles R. Lippold, Cleveland; R. Raymond Kay, Los Angeles; C. H. Ober, New York; J. M. Spackman, Pittsburgh; Harry Becker, European Representative.

REGIONAL OFFICES

Chicago 3, 10 S. LaSalle St.; Cleveland 14, 1016 National City Bank Bldg.; Detroit 2, 103 Pallister Ave.; Los Angeles 28, 2420 Cheremoya Ave.; New England, 62 La Salle Rd., W. Hartford 7; New York 17, 100 E. 42nd St.; Philadelphia 39, 56th & Chestnut Sts.; Pittsburgh 22, 814 Park Bldg.; San Francisco 3, 1355 Market St.; Washington 4, National Press Bldg.; European, 111 Thorley Lane, Timperley, Cheshire, England.

Circulation Representatives: Thomas Scott, James Richardson.

One of the Publications Owned and Published by Chilton Co., Inc., Chestnut & 56th Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

Vice-Presidents: Everit B. Terhune, G. C. Buzby, P. M. Fahrendorf, Harry V. Duffy, William H. Vallar, Treasurer; John Blair Moffett, Secretary; Maurice E. Cox, George T. Hook, Tom C. Campbell, Frank E. Tighe, L. V. Rowlands, Directors. George Maiswinkle, Asst. Treas.

Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries, $25 per year. Single Copies 35c. Annual Review and Metal Industry Facts Issue, $2.00. Cable address "Ironage" N. Y.

Member

Audit Bureau of Circulations

Society of Business Magazine Editors

National Business Publications

DIGEST

of the week in metalworking

PAGE 57 **MORE WAR WORK AHEAD FOR SMALL BUSINESS**

Defense tooling is nearer mass volume of military hard goods. Subcontracting opportunities are greater now and will gather more weight next year. Some small firms fear deeper civilian cutbacks. Some plants will find it tougher getting into the defense picture but all must be alert to leap in.

PAGE 58 **SCRAP STOCKS STAY AT CRITICAL LEVELS**

Steelmaking shutdowns are possible if winter snarls up transportation. Iron and steel scrap stocks range from less than 4 days to under a month—far below the safe 60 days. An Iron Age scrap inventory survey omits unprepared or scrap in transit while government estimates unrealistically count it.

PAGE 59 **STAMPERS OPTIMISTIC AT CONVENTION**

Confidence of members attending the 3-day annual meeting of the Pressed Metal Institute in Chicago was obvious. The stamping industry is feeling a noticeable pick-up in orders. The spring and summer slump is wearing off but press space is still available. More defense work also helps.

PAGE 60 **STEELMAKING CAPACITY SEEN SHIFTING**

Official figures show the beginning of a trend to build new steelmaking capacity away from traditional centers. Expansion plans show this trend will be heightened in the next 2 years. Official steel capacity rose 10,269,220 tons in 3 years. Capacity as of Jan. 1, 1951 was 104,502,680 tons.

PAGE 75 **STEEL WAGE RISE WINS POLITICAL BACKING**

People close to the White House will back the coming CIO Steelworkers' demands for higher wages and more fringe benefits. President Truman's policymakers have reached this decision over bitter protests of the anti-inflationists. OPS price men will be depicted as innocents with hands tied.

PAGE 80 **TOOL CUTBACKS MAY HIT NEW ENGINE PLANS**

Detroit reports persist Washington is tightening up on civilian tooling. Method will be to curtail materials to machine tool builders with civilian machines on order. At least two new engine programs will be hard hit. Debuts of 1952 auto models will be late. Most changes will be minor.

PAGE 87 **EUROPEANS LEAP INTO MACHINE TOOL MARKET**

Shortage-encouraged competition from Europe is making U. S. machine tool builders uneasy. Gains overseas firms are making now may hurt selling chances of domestic companies in the future normal market. U. S. manufacturers are importing more machine tools to beat the shortage.

PAGE 97 **ALCOA USES DIRECT-READING SPECTROMETER**

High-speed analysis of aluminum alloys on direct-reading quantometers cuts waiting time of Alcoa's holding hearths to a minimum. Of 7 million annual determinations, 60 pct are now made by this method. Figure will be 80 pct by year's end. Complete report takes no longer than 4 min.

PAGE 101 **T-T-T CURVES VALUABLE TO HEAT TREATERS**

Time-Temperature-Transformation curves reveal much valuable information on how to heat treat tool and die steels. They show how to minimize distortion of water-hardening and oil-hardening steels and the most satisfactory way to cool high-speed steels to satisfactorily transform austenite.

PAGE 110 **USAF STUDYING MACHINABILITY OF METALS**

The second volume of the machinability research program sponsored by the Air Force expands the microstructure—machinability correlation developed in the first report. Cutting speed—tool life charts are given for microstructures of 12 commonly used steels. Machining titanium described.

PAGE 139 **STRONG REACTION TO SLASHING CARRYOVERS**

Both steel users and producers reacted strongly to NPA's order preventing quarterly carryovers of more than seven days. Some consumers pointed out that one of the reasons for large carryovers is NPA directives which took priority over their material. Steel producers are blamed, too.

NEXT WEEK **USE FERROCHROMIUM FROM LOW GRADE ORE**

In addition to permitting much closer control of chromium content without chilling the steel bath, exothermic ferrochromium utilizes low grade chromium ores. Chrome-X is used in the ladle only and is but one of the exothermic ferroalloys available. Ferroalloys are reduced from chromite ores.

building industry uses

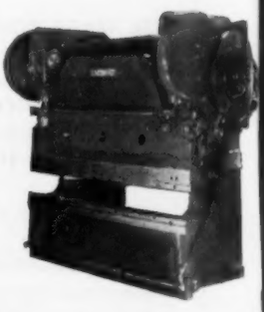
Cincinnati Press Brakes for multiple bends

Cincinnati Press Brakes are forming multiple bends in one hit on this aluminum siding—a high production item.

Economies—through speed, accuracy of performance and minimum handling—are giving low cost per piece.

Window and door frames, gutters, structural members and other items of the building industry are being produced on Cincinnati Press Brakes with parallel economies.

The unusual accuracy and great versatility of Cincinnati Press Brakes make them very profitable both for this production job and for jobbing work. Cincinnati Press Brakes produce a quality product at a low cost. They are a profitable investment.



THE CINCINNATI SHAPER CO.
CINCINNATI 25, OHIO, U.S.A.
SHAPERS · SHEARS · BRAKES

Write for comprehensive, illustrated catalog—B-2-A—covering construction and many uses of Cincinnati All-Steel Press Brakes.

the iron Age
FOUNDED 1855

Thought Control

THE executive branch of the government and its agencies may now classify information—supposedly similar to Defense Dept. rules along that line. This means that each department may use the "confidential" stamp to keep information from the press, the people and Congress. The reason for this far-reaching Truman order was the excuse that we must keep security information from our enemies.

The President must be naive to believe that an agency head with the power to classify information would not often misuse this right —especially when there is no penalty for misusing it and no board of appeal to act on protests.

Stripped of its verbiage this executive order means that if, in the opinion of an executive branch head, certain information involves security of the nation, it can be withheld. Whether Mr. Truman chooses to call this censorship or not, it is thought censorship. It leaves to the man at the head of a bureau the right to say what shall and what shall not be classified. If you think this does not concern you as a metalworking executive, take another thought.

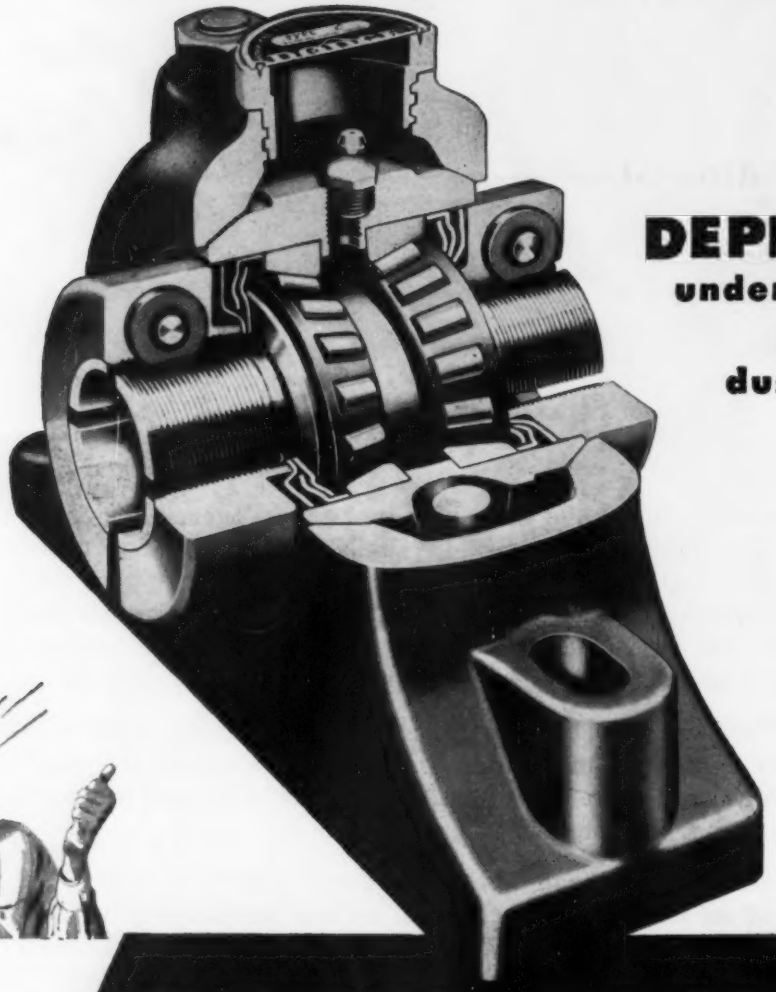
Significant and useful information on metalworking could be withheld. This is already taking place. The military, which has the right to restrict information, has time and again held up data, not because it is actually classified, but because someone said such information might be of benefit to the enemy. This in spite of the fact that officers with the authority to classify it had not seen fit to do so.

This order is a step towards censorship. We, as Americans, have viewed with alarm similar tactics in Argentina and in India. Even though our order is called something else, it has the same smell. It is thought censorship or thought control. No man "in the grease" because of a tight position, trouble or stupidity, is going to give up the chance of blacking out information if he has the authority to do so.

This order should be investigated by Congress to see that some appeal machinery is set up to protect the people against thought control.

Tom Campbell

Editor



DEPENDABLE
under severest conditions of dust and dirt!

DODGE-TIMKEN

- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16"to 4-15/16".

DODGE MANUFACTURING CORPORATION, 600 Union Street, Mishawaka, Indiana

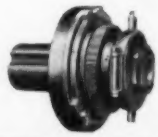
DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor for assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!

V-BELTS AND TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCERS



ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO, ILLINOIS

Dear Editor:

Letters from readers

Thanks!

Sir:

The rearrangement of the makeup of the magazine, which you introduced some time ago, was so disconcerting to me that I was glad to fill in the questionnaire which gave the readers a chance to voice suggestions as to an improved arrangement.

The new arrangement just introduced is so satisfactory that I should like to express my congratulations and appreciation for making it easier for me—as a typical reader—to find in the magazine those items in which I am most interested.

W. A. STEINER
Product Manager

National Carbon Div.
Union Carbide & Carbon Corp.
New York

Spreading Knowledge

Sir:

We have been very interested in the recent technical articles appearing in THE IRON AGE entitled "How To Get The Most From Your Lathes."

We would like to obtain reprints of this series of articles which tells how to increase the value of engine lathes through the use of various attachments and accessories. We would distribute these reprints to our sales engineers and representatives throughout the world, as we know they would derive much worthwhile information from them.

Will you kindly advise us the cost of 200 reprints.

G. W. McINTYRE, JR.
Advertising Manager

Reed-Prentice Corp.
Worcester

Electrolytic Grinding

Sir:

Your mention of our electrolytic grinding process in THE IRON AGE, Aug. 16, has led to an erroneous impression that this method eliminates the need or use of diamonds. Actually the method may increase the use of diamond grinding as the life of the diamond wheels probably will be increased by the electrolytic grinding.

We think what you meant to say was that because of the probable increase in wheel life of 20 to 30 times, electrolytic grinding will eliminate much of the present waste of industrial diamond use. Diamonds are the only material we know of which we can use in our process and we have every reason to believe we will continue to use diamonds.

L. H. METZGER
President

Super-Cut, Inc.
Chicago

Mr. Metzger is correct, we are sorry.—Ed.

New Organic Compound

Sir:

In your Machine Tool Letter of Sept. 17 you mention a new organic compound for use in heavy blanking operations on high carbon steels. We would like some further information on this material.

W. E. PETERS

The Cincinnati Shaper Co.
Cincinnati

More information may be obtained from Irwin Keil, Mill & Machinery Equipment Co., 549 W. Washington Blvd., Chicago.—Ed.

More Facts

Sir:

In your Aug. 9 issue you ran a feature story on a new system for handling sheet metal now installed at Pratt & Whitney Aircraft in East Hartford, Conn.

Your story was substantially complete except that you made no mention of the fact that this new system is manufactured by Acme Tank & Welding Div., The United Tool & Die Co. of West Hartford, as sole licensee. Patents have been applied for on the new system.

J. C. OWEN

Edward Owen & Co.
Avon, Conn.

No Punch Breakage

Sir:

In your Sept. 17 Machine Tool Letter we noticed an item about a midwestern fabricator having considerable success in punching 0.310-in. holes through 0.247-in. thick type 347 stainless steel without breaking or having to regrind a punch.

We are very much interested in knowing who this fabricator is.

E. E. VARGO

Lempco Products, Inc.
Bedford, Ohio

The fabricator is the Quick Tool Co. in Chicago.—Ed.

Rubber Pipe Joint

Sir:

We read the item on p. 104 of your May 3 issue pertaining to the new rubber pipe joint for hydraulic fittings claimed to be a leakproof joint for pressures up to 3500 psi. Who is the maker?

J. F. FOX

Armzen Co.
Waterbury, Conn.

Write to the Institute of Inventive Research, P. O. Box 2296, San Antonio, Tex., for more details.—Ed.

How TIMKEN® bearings make a short-haul engine long on economy

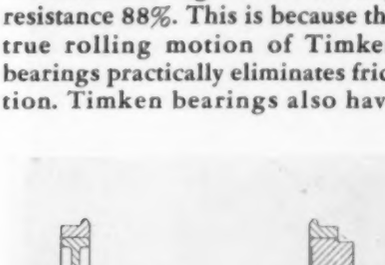
THIS diesel-powered Plymouth 65-ton yard locomotive, built by The Fate-Root-Heath Co., Plymouth, Ohio, is designed for short-haul jobs around industrial plants. To provide smooth, easy starting and to keep fuel and maintenance costs down, the axles are mounted on Timken® tapered roller bearings.

Timken bearings reduce starting resistance 88%. This is because the true rolling motion of Timken bearings practically eliminates friction. Timken bearings also have extra load-carrying capacity, resulting from line contact between rollers and races. And due to the tapered design of Timken bearings, radial and thrust loads are taken in any combination. Special thrust bearings are not necessary.

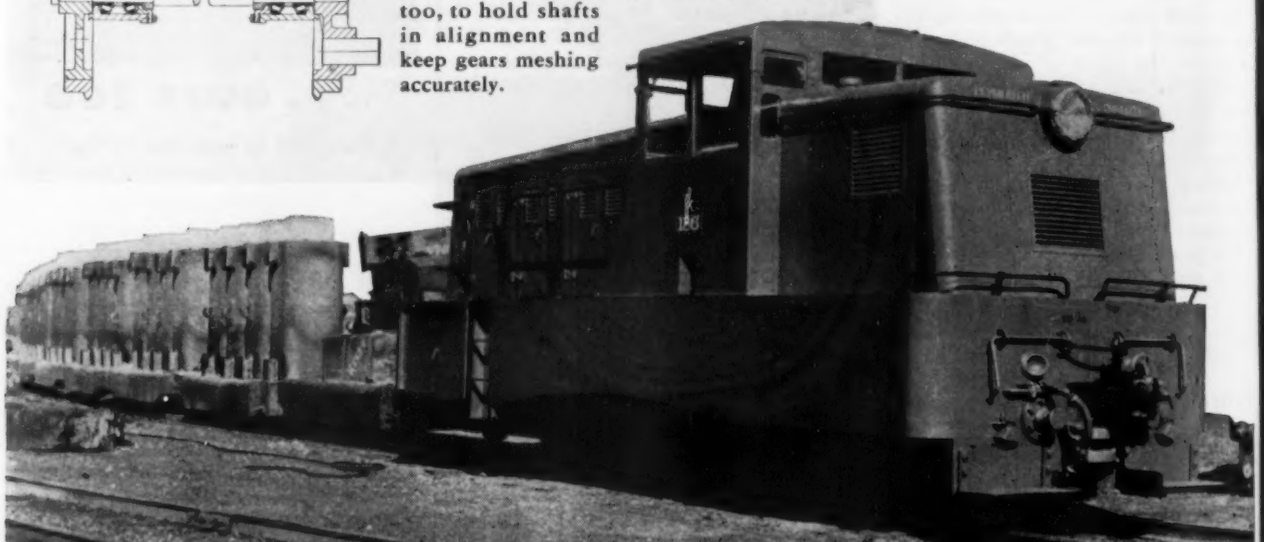
Closures are more effective because Timken bearings keep housing and shaft concentric. Lubricant is kept in; dirt and grit kept out. Result: Less time spent on repairs, less money spent on lubricants.

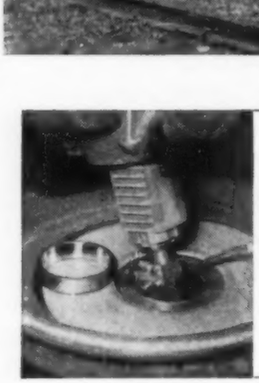
Timken bearings have been first choice throughout industry for more than half a century. Whether you buy or build any kind of machinery, specify Timken bearings. They're backed by unequalled research and development. Look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



THE FATE-ROOT-HEATH COMPANY mounts the axles of their 65-ton diesel yard locomotive on Timken bearings to assure fast, easy starts and a minimum of maintenance. Timken bearings are used in the gear drive, too, to hold shafts in alignment and keep gears meshing accurately.





FINISHED TO CLOSER TOLERANCES

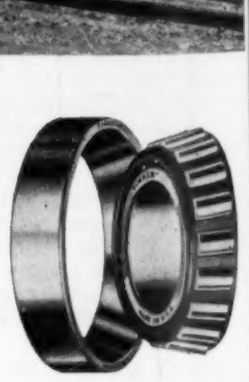
Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂ THE TIMKEN TAPERED ROLLER ⊃ BEARING TAKES RADIAL ⊃ AND THRUST ⊃ LOADS OR ANY COMBINATION

Fatigue Cracks

By Charles T. Post

Bird of Paradise

Bernard ('Buster') Davies, a large friendly man, is president of Doucet, Inc. . . . has discovered that at crucial times women want bright, gay designs . . . thinks they want reassurance when the headlines are scary . . . fits in with the theory that a lady can always re-establish her morals with a new hat or dress . . . New York Herald Tribune, Oct. 3, 1951, sketch on Business and Finance Leaders.

With the ladies, it's all in the clothes. When morals fail, the trouble is usually due to one little slip.

Southpaw

Your favorite family journal has always prided itself on being the first to report the newest equipment, sometimes when the manufacturers, themselves, would like to keep the secret.

For instance, take a look at the cartoon, below, which appeared on page 71 of the Sept. 27 issue.

"Is it well built?—Why it's got a 17-jewel movement."

Here, for the first time, is a drawing of a left-handed lathe. We've always had left-handed monkey wrenches, and left-handed baseball bats in order to hit right-handed pitchers. But here for the first time, the editors reveal the manufacturing process on turning left-handed butter plates for southpaw trenchermen. You need a 17-jewel movement for that, no less.

Aptronyms

Dr. James T. MacKenzie, technical director, American Cast Iron Pipe Co., is a man who keeps up on all the latest literature, particularly when it comes to steaks.

How else would he find, in the latest book catalogue, the volume entitled *"Bull—Meat for the Table."* Of course, it was written by Sleeter Bull, professor of meats, Agricultural Experiment Station, University of Illinois.

Puzzlers

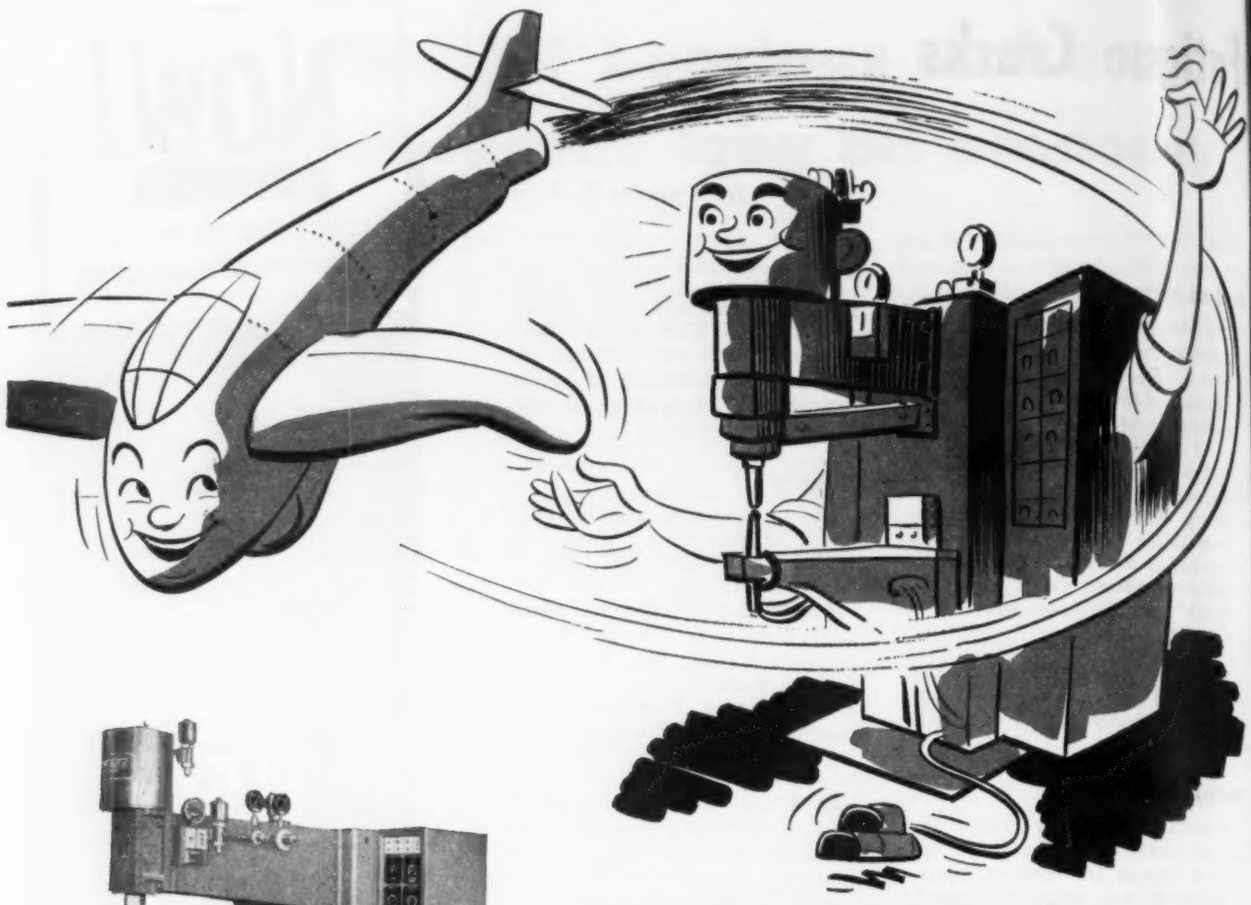
The diameter of the inscribed sphere in last week's puzzler is 11.765 in., so says the puzzle's author, R. W. Huff.

More answers to the tower puzzle from G. H. Fromer, Willys-Overland Motors, Inc., R. Hibeln, Western Electric Co., T. E. Martin, Wynnewood, Pa., E. E. Hearn, American Iron and Machine Works Co., and H. L. Ludwig, U. S. Steel Export Co.

E. M. Hoover, Washington, sent this one in a long time ago. He has three cards: one black on both sides, one white on both sides and one white on one side and black on the other. He puts the cards in a hat and a blindfold on himself. After removing one of the cards and placing it on the table he removes his blindfold and sees that the top of the card is black. What are the odds that the bottom side of the card is black too?

Jet Propelled

When D. I. Brown, your f.f.j.'s technical editor, flew into the village of Havre St. Pierre, terminal of the railroad to the titaniferous ore fields, he picked up a tale illustrative of the sudden impact of modern civilization on the back country. Back in 1948 or 1949, one of a hush-hush flight of U. S. Air Force jets ran into trouble, finally belly landed on a rough strip hewn by a bulldozer at the Quebec village. It took no time at all for a big plane load of Air Force brass to swoop down and take charge. And, in even less time, the entire population from miles around had swarmed around the field. When the officers had done their business, they climbed back into their big plane, which was equipped for jet-assist take-off. The crowd pushed close, but in the time it took for the plane to take off and circle back every last soul had disappeared. The officers learned later that the roar of those jets had scared the natives out of a year's growth.



OLD FRIENDS...

SCIAKY WELDERS

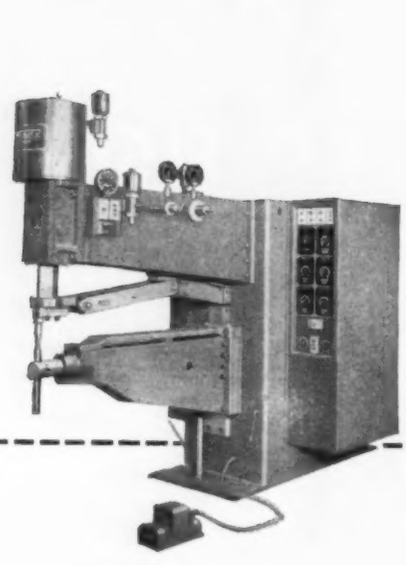
LEAD THE FIELD IN MEETING MILITARY WELDING SPECIFICATIONS

NINETY-FIVE per cent of all resistance welding to MIL-6860 and MIL-6858 Air Force-Navy Specifications is done on SCIAKY machines — PROOF of know-how . . . PROOF of high quality welding . . . PROOF of production. This fact is your guarantee of satisfaction.

Today, the new SCIAKY Series PMCO ST Three-Phase Welders offer new benefits to the aircraft industry and others welding aluminum, magnesium, brass, monel, inconel, stainless, super stainless, heat-resisting alloys and others. Each machine in this series is quickly adjustable to handle them all! Quality of welds is unequalled. Tip life is increased as much as 300%.

Sciaky guarantees to qualify the PMCO ST Welder to MIL Specifications at the time of installation in your plant. Write today for complete data on the welder that is the "Standard" for the aircraft industry.

SCIAKY BROTHERS, INC.
4923 W. 67th Street, Chicago 38, Illinois



PMCO ST Series
Resistance Welders

THIS series employs the patented Three-Phase Principle invented and brought to highest efficiency by Sciaky. This system offers many advantages over the conventional single phase welders. Among them:

- *Balanced* three phase load
- KVA demand reduced 75% or more
- Near unity power factor
- Versatility
- Speed

Send for Bulletins

Complete data on machines for ferrous and non-ferrous welding available on request. For specific information, write today, outlining your requirements.

SEE US AT THE METAL SHOW
DETROIT, OCTOBER 15-19
BOOTH H-305

SCIAKY
SAY "SEE-ACKY"

Conventions & Meetings

Oct. 9-13—**Concrete Reinforcing Steel Institute,** semi-annual meeting, Grove Park Inn, Asheville, N. C. Institute headquarters are at 38 S. Dearborn St., Chicago.

Oct. 9-12—**Electrochemical Society,** national convention, Hotel Statler, Detroit. Society headquarters are at 235 W. 102nd St., New York.

Oct. 10-12—**Porcelain Enamel Institute,** annual forum, Ohio State University, Columbus. Institute headquarters are at 1010 Vermont Ave., Washington.

Oct. 12-14—**Metal Treating Institute,** annual meeting, Hotel Detroit-Leland, Detroit. Institute headquarters are at 271 North Ave., New Rochelle, N. Y.

Oct. 15-17—**American Institute of Mining & Metallurgical Engineers, Institute of Metals Div.,** fall meeting, Detroit-Leland Hotel, Detroit. Institute headquarters are at 29 W. 39th St., New York.

Oct. 15-17—**American Gas Assn.,** annual convention, Jefferson Hotel, St. Louis. Association headquarters are at 420 Lexington Ave., New York.

Oct. 15-19—**National Metal Congress & Exposition, and World Metallurgical Congress,** Hotel Statler, Detroit. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

Oct. 18-20—**Anti-Friction Bearing Manufacturers Assn.,** fall meeting, The Homestead, Hot Springs, Va. Association headquarters are at 60 E. 42nd St., New York.

Oct. 20-23—**Steel Boiler Institute,** fall meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 1207 Land Title Bldg., Philadelphia.

Oct. 21-25—**American Institute of Steel Construction,** annual convention, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 101 Park Ave., New York.

Oct. 22-24—**American Mining Congress,** metal mining convention, Biltmore Hotel, Los Angeles. Association headquarters are in the Ring Bldg., Washington.

Oct. 22-24—**American Standards Assn.,** national standardization conference and annual meeting, Waldorf-Astoria Hotel, New York.

Oct. 22-25—**Wire Assn.,** annual convention, La Salle Hotel, Chicago. Association headquarters are at 300 Main St., Stamford, Conn.

Oct. 25-26—**Gray Iron Founders' Society,** annual meeting, Edgewater Beach Hotel, Chicago. Society headquarters are at 210 National City—E. 6th Bldg., Cleveland.

Oct. 28-30—**Conveyor Equipment Manufacturers Assn.,** annual meeting, The Homestead, Hot Springs, Va. Association headquarters are at 1129 Vermont Ave., N.W., Washington.

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► There'll be a big rhubarb on the steel wage issue this year. Each side will be adamant, so the whole issue will find its way to the White House. There'll be no wage increase without a steel price increase. Possibility of a strike is definite as a pressure point. Final outlook: higher wages, higher prices.

► A big steel expansion project involving substantial structural steel producing facilities on the West Coast is still in the hush hush talking stage. The shortage of structural steel may give it a push but there are obstacles in the way. One is the steel needed to build such a layout. The other is that there will have to be a lifting of the moratorium on rapid depreciation of steel facilities.

► Incidents like the recent Swiss transhipment of a boring mill to Hungary are hard to catch because anyone might use a boring mill. But a recent attempt by a Swiss firm to buy heavy steel mill equipment was nipped when the U. S. manufacturer--suspecting no need for it in Switzerland--called in the F.B.I.

► A recently completed survey by a large steel producer located 74 desirable industrial sites along three inland waterways. Both steel producers and consumers are showing more interest in river transportation to escape some of the impact of rising rail freight rates.

► Some companies building big new plants are getting worried about jams in schools, domestic water, telephone and sanitary facilities. Unable to notify local authorities in the planning stages until all real estate is acquired, they often find their plant building outstripping the essential services for employees.

► Steel sheet users are headed for more trouble. Defense demand for plates is so strong that more will have to be made on strip mills. Sheet output will be cut three ways: (1) Plates will replace sheets; (2) more sheets will go for defense; and (3) plate production on sheet and strip mills is slower, cuts down overall tonnage of the mills.

► Though their standby facilities are in better shape then ever, some steelmakers are worried about natural gas supplies if the winter is severe. For, on top of their scrap headache, is knowledge that domestic gas consumers come first and industry takes the cuts when storage proves inadequate in very bad weather.

► It's a mistake to judge appliance sales and inventories on refrigerators alone. Small appliances never fell off much, washer and dryer sales are very active; only refrigerators trail the appliance parade.

► A newly designed vacuum melting furnace cuts maintenance to a minimum. The assembly is an alundum tube heated by tungsten wire windings and set in a stainless steel jacket. Or it may use a graphite sleeve in an induction coil within the stainless jacket.

► The search for manganese gets deeper and deeper. Latest is government speculation on the possibility of salvaging the "Equipoise," sunk off the East Coast during World War II with an 8000-ton manganese ore cargo. Ore type and quality are unknown.

DOW CORNING

Silicone Notes
ON LUBRICATION

REFERENCE NO. SL-52

FILE SILICONE LUBRICANTS

Make sure you have basic data sheets BG-2, 5502, 7101. If misplaced write Department O-10

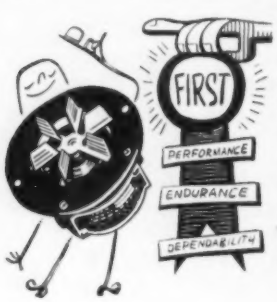
DOW CORNING CORPORATION
Midland, Michigan

DOW CORNING 200 FLUID

Dow Corning 200 Fluid has been tested at various temperatures in contact with oxygen under a pressure of 2000 psi. Presence of silicon dioxide was taken as evidence of oxidation. After 1 hour at 300° F. and after one-half hour at 390° F. there was no evidence of oxidation.

In actual practice, that kind of oxidation resistance is illustrated by the experience of the Breese Burners, Inc., of Santa Fe, New Mexico who manufacture the Drafbooster, a forced-air fan for oil-fired furnaces.

Back in 1940, Breese engineers installed a Drafbooster in a heater designed for use in their own offices. All went well the first season, but by the following season it was noted that the petroleum oil lubricating the fan motor's porous bronze bearings had thickened. The fan refused to run at normal speed; insufficient air was provided for complete combustion. By mid-winter, the Drafbooster had to be replaced.



The same thing happened with the next Drafbooster, and the next, and the next. Then, in November of 1945, they installed a unit lubricated with Dow Corning 200 Fluid. This Drafbooster has been in operation 6 years without replacement, relubrication or cleaning.

Breese engineers recently inspected their office unit and reported only negligible bearing wear. The silicone fluid has not thickened and is still crystal-clear. Dow Corning 200 Fluid satisfies their requirements so completely, they say, that if this silicone fluid suddenly became unavailable, they'd stop making Drafboosters.

DOW CORNING 550 SILICONE OIL

Dow Corning 550 is notable even among silicone fluids for its exceptional heat stability. Stability and oxidation resistance are demonstrated by the fact that it does not gel or decompose to form gums even after heating at 482° F. for 1000 hours in contact with air.

To Flash-O-Graph Corporation, of Long Island City, New York, that kind of oxidation resistance means an annual saving of thousands of dollars in maintenance and repair costs.

The Flash-O-Graph is an animated advertising sign for store windows and counters. The advertiser's message is punched in a black ribbon belt which is driven across the front of a fluorescent lamp by a phonograph-type motor. It is estimated that the belt revolves 31 million times a year.

For appearance's sake, the sign is almost totally enclosed. As a result, considerable heat develops and failure of the motor's sintered-bronze bearings is common. Once, in fact, an entire order of 1000 signs was replaced less than a week after shipment because of bearing failures.

Then, 16 months ago, Flash-O-Graph ran comparative tests between six signs lubricated with the highest grade petroleum oils and six with Dow Corning 550 silicone oil. The best of the petroleum lubricated group lasted only 20 days without relubrication. All six of the silicone lubricated group are still running . . . without relubrication.

About a year ago Flash-O-Graph standardized on Dow Corning 550 silicone oil for the bearings of sign motors. They estimate their service problem has been reduced 99%. Of thousands of silicone lubricated units since put into the field, not one has been returned because of bearing failure.

DOW CORNING CORPORATION · MIDLAND, MICHIGAN

DOW CORNING SILICONES

ATLANTA • CHICAGO 1 • CLEVELAND 13 • DALLAS 1 • LOS ANGELES 15 • NEW YORK 20 • WASHINGTON 5, D. C.

CANADA: Fiberglas Canada Ltd., 1200 Bay Street, Toronto, Ontario ENGLAND: Midland Silicones Ltd., 49 Park Lane, London, W. 1

WAR WORK: Subcontracts to Grow in '52

Defense tooling closer to mass output . . . Some small firms fear more cutbacks . . . Who can get hurt in greater defense production? . . . Reasons for subcontract lag—*By Ted Metaxas.*

The path is devious but momentum is unrelenting as a swelling defense program and its troubleshooting field commander, Controlled Materials Plan, takes small civilian industry into intensified rearmament.

Defense tooling is coming closer to mass output of military hard goods. Starting from an almost zero point in subcontracting, small business is now getting more defense work and can be positive of gradually enlarging opportunities next year. But some small firms are fearful that vast defense production will sap already precarious supplies of metals and deepen civilian cutbacks.

The Defense Pie—Washington plans to obligate $100 billion for military hard goods. About $50 billion has been spent already, with $14 billion worth of war products delivered. In 1952 defense deliveries must jump from 25 to 30 pct over those of the fourth quarter 1951—and stay on the upsurge.

Government officials admit that civilian industry is entering the period of harshest metal austerity. Yet many small businesses say their state is now comfortable. Demand is considered sounder, picking up some of the ground lost but yet not having the bounce of the 1950 market.

Procurement of metals is more difficult but somehow small business is getting most of what it needs to take on as much civilian production as demand warrants. Starting in January, warehouses will get 100 pct of base period shipments of steel, instead of the current 85 pct. Small users stand a better chance of filling their CMP tickets.

Shrink Safety Island—More civilian cutbacks in 1952 can shrink small business' safety island to a chalk mark. It must be alert to assure its metals supply through defense subcontracts. As cutbacks deepen because of defense need, so will subcontracting grow.

Small business, even if wary, can be optimistic over its future in the altering production scene. Its shiniest asset is adaptability.

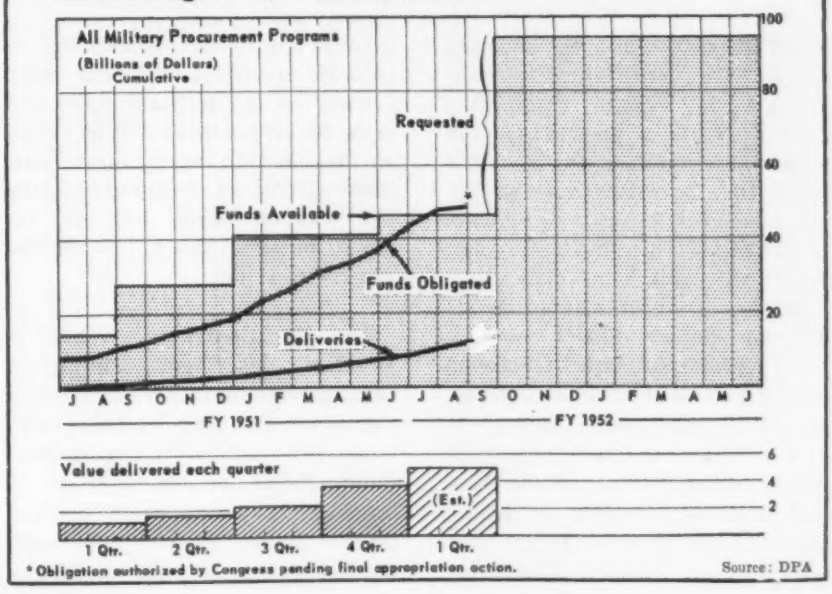
Who will fare best in the switchover? Plants with World War II prime and subcontracting experience with sound supply affiliations to the big prime contractors will either continue producing essentially the same products or be able to make adequate modifications. When prime contractors complete tooling up, subcontracting will become normal. Supply lines may sometimes detour in search of new skills.

Hardship for Some—Who could get hurt? Plants making light civilian parts or end products, without strong ties to big prime contractors, are less secure. This manufacturing may involve simple processes capable of making incredible numbers of gadgets, novelties, trim and decorations, light stampings, jewelry, small items.

More complex ordnance, electronic equipment, aircraft parts demand closer tolerances than ever before. Some machine shops which fitted easily into World War II production may discover that their now older machines can no longer fulfill specifications.

Aircraft Opportunities — Notable in subcontracting activity will be aircraft producers. Having

Military procurement: nearly $100 billion programmed-one-half obligated–$14 billion delivered



* Obligation authorized by Congress pending final appropriation action.

Source: DPA

SCRAP: Stocks Stay at Critical Lows

Median of 15 days supply far afield from normal 60 days . . . Larger steelmakers with lower inventory make picture blacker . . . Government estimates include scrap not available.

Stocks of steelmaking scrap on the ground at mills in the major steel centers range from less than 4 days to less than a month's supply at current operating rates. The median is about 15 days. This is in sharp contrast to the 60-day supply they would normally carry at this time of the year.

The figures are based on an IRON AGE survey of major mills—with identification omitted for obvious reasons. They are not guesses; in many cases IRON AGE editors saw company records in purchasing offices. In all cases scrap buyers were queried for their actual figures. (See box.)

Only What's There—They represent prepared carbon steel scrap on the ground at these mills on Oct. 1. For this reason they are considerably lower than government figures which include a great many things that do not permit a contrast with the 60-day minimum mills ordinarily require as they go into the winter months.

Blacker Picture—Several alarming things were uncovered in the survey. The figures in the accompanying box do not indicate plant size. In some cases the word "plant" actually means a company's entire operation in one district.

So, while one mill may have a 28-day supply, it may be a small user for which 20 cars of scrap would make a big difference. But in other cases where supplies are enough for only a week's operations or less, it takes a trainload or more to feed that mill for a single day.

In another case, an operating vice-president had a chart which couldn't show anything more than a 5-day supply—his shop had never had more than 4 days' scrap on hand in the past month.

Winter Danger — Steel mill scrap buyers had no criticism of NPA efforts to bring out more scrap. But there was a little grumbling about allocations taking away some of their best home scrap. But in their private talks with local scrap drive officials they have had to point out that Bureau of Mines figures showing, say a 2-month reserve in their district, had to be used properly.

Locomotives ready for junking, mill scale, skulls, etc.—which are included in Bureau of Mines data—can't be considered in the same class as prepared carbon steel scrap. If prepared stocks at a big mill are at a 4-day level and winter halts shipments, that mill will lay off thousands of workers on the fifth day. It's as simple as that—and as serious as that.

Scrap Stocks
No. of Days' Supply

Plant	Days	Plant	Days
A	3.7	J	25.
B	9.8	K	20.
C	10.4	L	30.
D	16.7	M	8.5
E	15.	N	7.
F	15.	O	28.
G	25.	P	4.
H	15.	Q	10.
I	21.		

Special Report

(Continued)

limited capacity when the shooting started, they are forced to subcontract to expand production quickly. With a growth to 140 wings contemplated for the Air Force, they have star defense billing. Lockheed Aircraft Corp. will subcontract $300 million this year. Others will chip in as generously, farming out from 60 to 65¢ of their government dollar.

Taking up one-sixth of defense spending, tank-automotive deliveries will increase seven times next year. The crest will not come until 1953. General Motors leads this field with $3.5 billion in prime contracts, as of June 1951.

When mass volume of heavier defense equipment is reached in 1952-53, spending will bear more acutely on the military odds and ends. Small business will be called on to produce more mess kits, communications equipment, rifle and weapon parts, helmets, insignia buttons, shoes, cots, kitchens, kettles, etc.

Lag in Contracts — What is popularly described as a lag in defense subcontracts has been caused by planning for heavy ordnance first and the "knick-knacks" later. Prime contracts went to large firms which could produce tanks, trucks, jet engines and planes. The tooling up stage was delayed by machine tool shortages.

Although the many small business departments of military services and government agencies demonstrated the will to see that small business got its share of contracts, they have been held back by the character of early industrial mobilization.

However valid the reasons for not bringing small business more fully into defense, small plants insist they are not getting enough defense contracts. An IRON AGE survey of a number of small civilian manufacturers seeking subcontracts indicated profit was not the motive. They want insurance policies on their metal supplies.

STAMPINGS: Outlook Optimistic

Confidence pervades PMI convention . . . Planning, sales efforts pay off . . . Appliance pickup helps . . . Steel shortage a major problem . . . Shift to defense work—*By Gene Beaudet.*

A note of optimism pervaded the 4-day annual convention of the Pressed Metal Institute held in Chicago last week. The industry which stamps out parts for appliance, television, radio, kitchen equipment and a variety of other manufacturers is experiencing a noticeable pick-up in orders for metal stampings.

During the first 3 months of the year stampers were doing a record business. Then around April orders began to fall off sharply. Consumer durable goods manufacturers were piling up high inventories as the market for these products began to soften.

Metal stampers were among the first to feel its effects. In some cases, orders for some parts fell to zero in a month's time. Others were drastically cut. After the first shock the industry lagged along at a slow rate through the month of August. In September things began to happen again. Orders picked up and are continuing to increase during October.

Picking Up—While there is still a good deal of press space available and no one is turning business away, the pendulum has definitely started to swing upward again.

For one thing the appliance industry has started to come back. While some items are still easy, other products such as automatic washers, dryers, small appliances and kitchen cabinets are becoming more difficult to buy without waiting several weeks for delivery. The radio and television industry bolstered by defense orders and an improving market are rehiring workers laid-off several months ago.

Brains, Not Luck—This pick-up in the volume of stamping orders didn't come about wholly by chance. Faced with a tough problem, companies went out and bid on parts they never even considered before. They searched their memories for items that were tight during the last war and went out to get orders to make them. Sales efforts were redoubled all along the line.

They soon snapped out of the lassitude characterized by one salesman who remarked at the time, "If our friends won't give us orders, how do you expect strangers to?" As a result of this increased effort, defense business is accounting for 30 to 75 pct of the volume of some firms and civilian orders are rising.

With both defense and civilian business on the upswing steel procurement continues to be a major problem. When not busy quoting on new orders companies are trying to get steel to fill those they already have. As the defense program gathers momentum metal stampers are tending more and more to defense business to assure themselves of adequate supplies of steel.

Convention Highlights — Features of the well-attended convention were a twenty company exhibition of safety devices for stamping plants and a report on the British stamping industry by an American pressed metal team recently returned from that country. At a luncheon meeting Tom Campbell, Editor of THE IRON AGE, discussed the various characteristics of small business that make them such a vital part of our economy.

He said small business had flexibility of production not enjoyed by bigger companies and could turn to specialties in addition to standard products.

The main speaker at the convention was Bennet S. Chapple, Jr., assistant executive vice-president, United States Steel Co. Mr. Chapple warned members that government controls won't work in a capitalist economy regardless of the good faith or skill of the administrators.

In outlining the fundamentals of an intelligent program for the present crisis, he urged that production be maintained at highest levels and that the product mix of steel output be related to the civilian and military needs of the country. He added that direct defense requirements should be handled first and that complete realism be developed concerning the amount of steel needed to support today's economy.

At a Board of Directors meeting on Thursday, Thomas L. Baker, National Stamping Co., Detroit, was elected president of the association. Owen H. Wenning, Worcester Pressed Steel Co., Worcester, was made vice-president, and Hunter Morrison, Jr., Morrison Products, Inc., Cleveland, was elected treasurer.

"Your wife is helping with your scrap drive—your new car is on the junk heap."

New Plant for Plane Parts

General Fireproofing Co., Youngstown, will build a $1.5 million addition for the production of jet fighter and bomber plane parts.

The company will spend about $500,000 on the building, which will house $1 million in machine tools to be furnished by airplane companies for which General Fireproofing is subcontracting.

GF already is producing subassemblies for F-84 Thunderjet fighter planes and for the B-47 jet bombers.

STEEL: New Capacity Shifting

Big steel centers get smaller pct of new ingot capacity . . . Philadelphia gains again . . . Trend to grow . . . Data, AISI Directory.

Ingot Capacity by Districts

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons			
	1951	1948	1945	1936
Pittsburgh				
Allegheny Ludlum Steel Corp.	766,850	430,860	394,860	523,040
American Locomotive Co.	103,000	103,000	103,000	103,040
American Steel & Wire Co.	900,000	842,000	842,000	702,240
Armco Steel Corp.	474,000	432,000	591,000	649,600
Babcock & Wilcox Tube Co.	64,800	50,400	50,400	.....
Bethlehem Steel Co.	2,028,000	1,900,000	1,900,000	1,367,600
Braeburn Alloy Steel Corp.	20,730	20,730	20,730	5,645
Byers, A. M. Co.	75,000	150,000	150,000	.....
United States Steel Co.				
Clairton	870,000	805,000	805,000	504,000
Duquesne	1,942,800	1,742,800	2,146,800	1,904,000
Edgar Thomson	2,080,400	1,753,000	2,297,000	1,680,000
Homestead	4,866,000	4,279,000	4,732,000	3,136,000
Johnstown	24,400	24,400	24,400	.....
Vandergrift	480,000	500,000	500,000	380,800
Total	10,263,600	9,104,200	10,552,200	7,604,800
Colonial Steel Co.	7,020	7,020	7,020	58,240
Crucible Steel Co.				
La Belle	.....	.....	3,780	23,330
Midland	1,095,000	997,950	1,034,400	672,000
Park	.....	183,100	181,500	134,400
Total	1,095,000	1,181,050	1,219,680	829,730
Edgewater Steel Co.	146,470	140,170	140,170	84,000
Firth Sterling Steel & Carbide Corp.	20,040	20,040	17,540	16,222
Heppenstall Steel Co.	42,880	46,580	42,560	42,560
Jessop Steel Co.	41,560	50,000	50,000	17,920
Jones & Laughlin Steel Corp.				
Aliquippa	1,764,000	1,764,000	1,764,000	1,622,880
Pittsburgh	2,137,500	2,137,500	2,233,500	2,476,320
Total	3,901,500	3,901,500	3,997,500	4,099,200
Latrobe Electric Steel Co.	12,000	12,000	12,000	13,440
Mesta Machine Co.	105,000	105,000	105,000	72,800
National Tube Co.	1,164,000	1,164,000	1,200,000	1,077,440
Pittsburgh Steel Co.	1,072,000	1,072,000	1,072,000	806,400
Union Electric Steel Corp.	26,760	21,000	25,200	10,080
Universal-Cyclops Steel Corp.	54,120	54,120	54,120	33,600
Vanadium-Alloys Steel Co.	11,910	11,910	11,910	5,600
Vulcan Crucible Steel Co.	9,600	9,600	9,600	4,234
TOTAL Pittsburgh District	22,405,850	20,829,180	22,521,400	18,554,743
Chicago				
American Locomtive Co.	78,000	78,000	78,000	78,400
American Steel & Wire Co.	918,000	690,000	610,400	336,000
United States Steel Co.				
Gary	6,025,700	5,718,800	5,718,800	5,855,360
South Works	4,675,000	4,525,000	4,525,000	4,874,240
Total	10,700,700	10,243,800	10,243,800	10,729,600
Columbia Tool Steel Co.	6,600	6,600	6,600	4,480
Continental Steel Corp.	393,760	364,000	364,000	313,600
Reconstruction Finance Corp.				
South Chicago	.....	.....	80,000	.....
East Chicago	.....	120,000	120,000	.....
Total	.....	120,000	200,000	.....
Borg-Warner Corp.	28,350	24,000	24,000	14,757
Inland Steel Co.	3,750,000	3,400,000	3,400,000	2,620,800
International Harvester Co.	900,000	900,000	900,000	769,104
Joslyn Mfg. & Supply Co.	37,500	37,500	37,500	.....
Northwestern Steel & Wire Co.	321,000	321,000	321,000	33,600
Republic Steel Corp.	1,100,000	1,225,000	1,301,000	456,960
Youngstown Sheet & Tube Co.	1,526,000	1,446,000	1,446,000	1,064,000
TOTAL Chicago District	19,759,910	18,855,900	18,932,300	16,421,301
Valley (Youngstown)				
Industrial Forge & Steel Inc.	48,600	50,000	50,000	11,290
United States Steel Co.				
Youngstown	2,484,000	2,344,000	2,344,000	2,060,800
Copperweld Steel Co.	554,400	450,000	321,360	.....
Empire Steel Co.	390,320	369,730	348,540	343,298
Reconstruction Finance Corp.	360,000	360,000*	.....	.....
Republic Steel Corp.				
Canton	975,000	775,000	1,445,000	1,179,360
Massillon	610,000	610,000	610,000	585,760
Warren	900,000	860,000	950,000	734,720
Youngstown	2,130,000	2,150,000	2,350,000	1,705,760
Total	4,615,000	3,395,000	5,355,000	4,205,600
Sharon Steel Co.				
Farrell	981,400	1,000,000	1,050,000	896,000
Lowellville	460,000	572,000	636,000	504,000
Timken Roller Bearing Co.	547,200	547,200	547,200	336,000
Vacuum Melt Co.	1,800	.....	.....	.....
Youngstown Sheet & Tube Co.				
Brier Hill	1,182,000	1,104,000	1,104,000	940,800
Campbell	1,542,000	1,452,000	1,452,000	1,489,600
Total	2,724,000	2,556,000	2,556,000	2,430,400
TOTAL Valley District	13,166,720	12,643,930	13,208,100	10,787,388

* Idle capacity formerly reported with Republic at Canton.

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons			
	1951	1948	1945	1936
Philadelphia				
Alan Wood Steel Co.	550,000	550,000	550,000	739,200
American Bridge Co.	.....	.....	.....	268,800
Armco Steel Corp. (Rustless Iron & Steel Div.)	102,000	95,000	114,000	21,132
Baldwin-Lima-Hamilton Corp.	149,300	149,300	169,930	123,984
Bethlehem Steel Co.				
Bethlehem	3,080,000	2,585,000	2,503,000	2,013,760
Sparrows Point	5,160,000	4,651,000	4,075,000	2,813,664
Steelton	1,032,000	886,000	740,000	709,632
Total	9,272,000	8,122,000	7,318,000	5,537,056
Boiardi Steel Corp.	50,760	.....	.....	.....
Carpenter Steel Co.	81,360	74,880	74,880	43,904
Central Iron & Steel Co.	406,000	288,000	336,000	336,000
Eastern Stainless Steel Co.	12,000	.....	.....	.....
Henry Disston & Sons, Inc.	25,000	25,000	25,000	13,440
Harrisburg Steel Corp.	100,750	100,750	100,750	86,800
Lukens Steel Co.	675,000	624,000	624,000	844,480
Midvale Co.	417,370	523,770	519,370	300,187
Newport News Shipbldg. & Dry-dock Co.	12,000	7,500	7,500	2,464
Old Dominion Iron & Steel Works	.....	.....	.....	2,800
Phoenix-Apollo Steel Co.	431,430	231,400	231,400	231,614
J. A. Roebling's Sons Co.	204,870	253,000	253,000	212,800
U. S. Naval Gun Factory	.....	.....	.....	2,016
Claymont Steel Corp.	468,000	460,000	460,000	423,360
TOTAL Philadelphia District	12,957,840	11,504,600	10,783,830	9,190,039
Buffalo				
Allegheny Ludlum Steel Co.				
Dunkirk	33,000	33,000	33,000	16,800
Tonawanda	4,500	4,500	4,500	.....
Total	37,500	37,500	37,500	16,800
Bethlehem Steel Corp.	3,920,000	3,120,000	3,120,000	2,649,025
Erie Forge Co.	85,000	80,000	80,000	22,960
Erie Forge & Steel Co.	.....	128,950	128,950	76,875
National Forge & Ordnance Co.	25,000	25,000	25,000	11,200
Republic Steel Corp.	870,000	830,000	850,000	633,920
Simonds Saw & Steel Co.	21,600	21,600	21,600	11,200
Colorado Fuel & Iron Corp.	240,000	180,000	180,000	168,000
TOTAL Buffalo District	5,199,100	4,423,050	4,448,575	3,589,980
Cleveland				
Jones & Laughlin Steel Corp.	945,000	840,000	1,026,900	843,360
National Tube Co.	2,250,000	1,884,000	1,944,000	1,747,200
Republic Steel Corp.	1,637,000	1,500,000	1,570,000	1,480,640
TOTAL Cleveland District	4,832,000	4,224,000	4,540,900	4,071,200

The Iron Age Districts Annual Steel Capacity

In Thousands of Net Tons—*Source: American Iron & Steel Institute Directory—Compilations by Districts: The Iron Age*

District	1951		1948		1945		1936	
	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total
Pittsburgh	22,406	21.44	20,829	22.10	22,521	23.58	18,555	23.83
Chicago	19,760	18.91	18,856	20.01	18,932	19.82	16,421	21.09
Youngstown	13,167	12.60	12,644	13.42	13,208	13.83	10,787	13.86
Philadelphia	12,958	12.40	11,505	12.21	10,784	11.29	9,190	11.80
Western	6,878	6.58	5,706	6.06	5,467	5.72	2,034	2.61
Buffalo	5,200	4.98	4,423	4.69	4,443	4.65	3,890	5.00
Cleveland	4,832	4.62	4,224	4.48	4,541	4.75	4,071	5.23
Detroit	4,770	4.56	3,473	3.69	3,190	3.34	2,234	2.87
Wheeling	4,281	4.10	3,495	3.71	3,320	3.48	3,662	4.70
Southern	3,985	3.81	3,837	4.07	3,701	3.88	2,616	3.36
South Ohio River	3,795	3.63	2,933	3.11	2,760	2.89	2,379	3.06
St. Louis	1,863	1.78	1,674	1.78	1,758	1.84	1,436	1.84
Eastern	615	0.59	634	0.67	879	0.92	577	0.74
Total	104,503	100.00	94,233	100.00	95,503	100.00	77,852	100.00

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons			
	1951	1948	1945	1936
Western				
Sheffield Steel Corp. (Armco)				
Sands Springs	54,000	54,000	54,000	56,000
Houston	840,000	560,000	466,000	.....
Total	894,000	614,000	520,000	56,000
Bethlehem Pacific Coast Steel Co.				
Los Angeles	324,000	213,000	117,000	95,200
San Francisco	240,000	235,000	235,000	173,600
Seattle	216,000	210,000	210,000	156,800
Total	780,000	658,000	562,000	425,600
Colorado Fuel & Iron Co.	1,320,000	1,272,000	1,272,000	991,245
Columbia Steel Co.				
Pittsburg	364,700	362,600	416,600	263,648
Torrance	213,700	208,200	211,000	196,000
Total	578,400	570,800	627,600	459,648
Geneva Steel Co.	1,440,000	1,283,400	1,283,400	.....
Isaacson Iron Works	101,520	104,400	104,400	.....
Judson Steel Co.	76,500	76,500	76,500	71,971
Kaiser Steel Corp., Inc.	1,200,000	870,000	750,000	.....
National Supply Co.	50,400	41,400	45,900	8,400
Northwest Steel Rolling Mills	32,400	32,400	32,400	16,800
Oregon Steel Mills	110,000	66,100	60,000	.....
Pacific States Steel Corp.	231,300	94,500	88,820	.....
Southwest Steel Rolling Mills	36,000	.....	.....	.....
Texas Steel Corp.	22,320	22,320	22,320	4,256
TOTAL Western District	6,872,840	5,705,820	5,466,790	2,033,920
Wheeling				
Carnegie-Illinois Steel Corp.	.....	.....	.....	672,000
Follansbee	.....	.....	.....	100,800
Ohio River Steel Corp.	121,200	136,080	126,000	123,200
National Steel Corp.				
Weirton Steel Co.	2,300,000	1,950,000	1,850,000	1,478,400
Wheeling Steel Corp.				
Benwood	420,000	336,000	336,000	280,000
Steubenville	1,440,000	1,073,000	1,008,000	1,008,000
Total	1,860,000	1,409,000	1,344,000	1,288,000
TOTAL Wheeling District	4,281,200	3,495,080	3,320,000	3,662,400
St. Louis				
Armco Steel Corp.				
Scullin	.....	.....	.....	228,614
Sheffield Steel Corp.	420,000	426,000	426,000	260,288
Granite City Steel Co.	720,000	620,000	703,200	403,200
Keystone Steel & Wire Co.	325,000	302,400	302,400	264,580
Laclede Steel Co.	397,840	326,020	326,020	278,840
TOTAL St. Louis District	1,862,840	1,674,420	1,757,620	1,435,522

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons			
	1951	1948	1945	1936
Southern				
Atlantic Steel Co.	188,000	165,000	154,000	153,485
Case Co., J. I.	.....	74,400	74,400	16,800
Connors Steel Co.	60,000	60,000	60,000	.....
Kilby Steel Co.	34,020	.....	.....	.....
Knoxville Iron Co.	38,000	38,000	38,000	.....
Republic Steel Co.	745,000	650,000	715,000	448,000
Tennessee Coal, Iron & R. R. Co.				
Ensley	1,568,000	1,568,000	1,568,000	1,075,200
Fairfield	1,352,000	1,282,000	1,092,000	922,880
Total	2,920,000	2,850,000	2,660,000	1,998,080
TOTAL Southern District	3,985,020	3,837,400	3,701,400	2,616,365
Eastern				
Allegheny Ludlum Steel Co.	25,000	25,000	25,000	25,760
American Steel & Wire Co.	250,000	250,000	280,000	212,800
Crucible Steel Co. of America				
Harrison	2,160	4,800	210,000	34,384
Syracuse	56,280	67,800	24,000	16,800
Halcomb	.....	.....	54,000	49,168
Total	58,440	72,600	288,000	100,352
Stanley Works	188,280	188,200	188,280	134,400
Washburn Wire Co.	93,000	60,000	60,000	57,120
Wickwire Brothers, Inc.	.....	38,000	38,000	47,040
TOTAL Eastern District	614,720	633,880	879,280	577,472
Detroit				
Allegheny Ludlum Co.	3,000	3,000	3,000	.....
Ford Motor Co.	1,471,940	1,115,100	967,420	604,800
Great Lakes Steel Corp.	2,450,000	2,100,000	2,050,000	1,545,600
McLouth Steel Corp.	420,000	.....	.....	.....
Rotary Electric Steel Corp.	425,000	255,000	170,000	84,000
TOTAL Detroit District	4,769,940	3,473,100	3,190,420	2,234,400
South Ohio River				
Armco Steel Corp.				
Ashland	900,000	828,000	783,000	619,808
Middletown	1,540,000	972,000	948,000	815,360
Total	2,440,000	1,800,000	1,731,000	1,435,168
Newport Steel Corp.	704,700	413,100	413,100	384,160
Detroit Steel Corp.	650,000	720,000	616,000	560,000
TOTAL South Ohio District	3,794,700	2,933,100	2,760,100	2,379,328

SET WAGE: No Longer Side Issue?

Will Steelworkers' Murray make stand on guaranteed annual wage? . . . Management will fight but Murray seen accepting loopholes . . . Set wage still unproven—*By John Delaney.*

Is this the year Phil Murray will make a stand on the guaranteed wage for steel labor?

This has been a perennial demand by Mr. Murray for his CIO United Steelworkers of America and, until recent weeks, nobody took him too seriously. Somehow or other, the question always managed to disappear once contract bargaining began in earnest. The guaranteed wage was expendable.

However, strong rumors are now circulating that this is the year the steel union leader expects to make it stick.

Coming Soon—At a recent meeting of American Management Assn. in New York, Nat Weinberg, research director for the CIO United Auto Workers, said management might as well make up its mind that the guaranteed wage for mass production industries is coming—and soon.

A guaranteed wage for steel workers would pose perhaps the most critical problem that has ever confronted steel management. For this reason, Mr. Murray is likely to encounter stiff resistance. If it is written into the contract at all, it is likely to be hemmed in by all sorts of limitations and "escapes" for management.

The chances are that Mr. Murray would be willing to go along with such restrictions. The important thing would be to gain a foothold that could be expanded later on.

Minimize Idleness — The steel workers—and all other CIO unions, for that matter—would like a guarantee of 40 hr work per week, 50 weeks a year, plus vacations, for all workers with the company 3 months or more.

Murray argues that such guarantees are necessary to protect the worker against recurring depressions. He feels this would sustain the economy by maintaining buying power, and that management would benefit by lower unit cost through steady operation of manufacturing facilities.

He contends such a plan would give management an incentive to better organize its facilities to minimize idleness.

Most economists say the guaranteed wage is not as simple as it might seem. Some contend that for it to work in mass production industries it may be necessary to institute a system of planned economy for the entire nation.

System's Unproven—While there are several hundred guaranteed wage plans in operation throughout the country, most of them are limited in scope, and experience to date gives little hint of the effect on the economy were such a plan applied to such industries as steel, coal, automobile manufacture, etc.

Nearly all the unqualified plans apply to small employers, the great majority of them in the distributive trades.

Dropped in Crisis—Most plans established before 1930 failed to survive the depression.

In the absence of any real experience in big industry, some economists have raised the question of what effect the guaranteed wage would have on industry. They wonder whether it would raise the break-even point, whether employers would tend to hire fewer workers, whether business expansion would be retarded.

B-W Warns UAW Strike Own Fault

In a letter addressed to union officials, Roy C. Ingersoll, president, Borg-Warner Corp., placed the responsibility for keeping employees at work upon the International Union of UAW-CIO. The letter was written in response to notification from UAW-CIO president Walter P. Reuther that 10 of Borg-Warner's plants will be struck on Oct. 10 unless a master contract is negotiated with the union.

The Borg-Warner Corp. had previously pointed out to union officials that under a long established policy of decentralized control, the central offices of the company in Chicago do not direct nor interfere with the employee relations of the individual divisions and plants.

In his letter Mr. Ingersoll wrote, "We request that you direct your local unions to meet at the bargaining tables with the divisional managements of Borg-Warner in their various plant communities where they have been duly certified to bargain by the National Labor Relations Board."

Twelve Borg-Warner plants have UAW-CIO contracts covering about 11,250 persons. Two of these plants have recently rejected the International union's drive for a master contract and have negotiated and ratified local agreements. If a strike were to become effective in the 10 other plants with UAW-CIO contracts, approximately 6000 workers would be made idle.

Strikes at USS Gary, South Works

Strikes at the South and Gary Works of United States Steel Co. continued at press time.

The No. 4 shop at South had lost 24,000 tons of ingots and the No. 2 shop 10,800 tons for a total of 34,800 tons of ingots lost as of last

Monday. The strike started on Thursday of last week.

Bad Work—Strike resulted from the disciplinary suspension of two workmen because of faulty workmanship. Local 65 of the United Steel Workers claims the faulty workmanship resulted from defective equipment rather than carelessness. Action of the crew in the No. 2 shop was in sympathy with the No. 4 shop.

Gary Strike—At the Gary Works, 90 striking crane men who have been engaged in a strike since Wednesday of last week continued to tie up 11 merchant mills and idle 3000 other employees. About 6900 tons of rolling are lost daily. According to company officials the dispute arose because the men objected to split turns. However, they claim officially not to know the cause because regular grievance procedure was not followed.

Wage Freeze Exemptions Studied

Question of whether or not smaller firms should be exempted from federal wage regulation may be settled before the end of October.

Wage Stabilization Board has named a tripartite committee—consisting of industry, labor, and public representatives—to study the problem and report back.

Set New World Safety Record

It's ten times safer at the Sharon, Pa., plant of Westinghouse Electric Corp. than it is outside the plant.

Between Jan. 16 and June 5, the 7000 Westinghouse transformer division workers compiled a world's safety record of 5,440,000 man-hours of work without a lost-time accident.

Lorain Workers Bond-Conscious

Defense bond-conscious workers at the Lorain, Ohio, plant of National Tube Co. signed up 99 pct during a 1-week campaign at the plant recently. Only slightly more than 100 of the nearly 12,000 employees failed to sign up for purchase of bonds through payroll deduction.

SEMINARS: AMA Opens New Center

New management center plush and efficient . . . Will house expanded AMA seminars . . . Groups kept small but 2800 have taken part in discussions . . . Aim is education of management.

School was never like this! That's our first impression upon viewing the new management center just completed by American Management Assn. adjacent to its headquarters at 330 West 42nd St., New York.

The new center is both plush and efficient. It will be used as headquarters for AMA workshop seminars (formerly held in hotels) which have expanded so fast since they were started 2 years ago.

AMA's WORKSHOP . . . main lounge features homey atmosphere.

What They Are—In this short time the seminars have established themselves as a unique tool for effective education of management. Since the first one in September, 1949, there have been 145 groups and 2800 participants. Many of those who have benefited from the seminars return again for discussion of other interesting subjects or problems.

How They Work—The seminars are small discussion groups devoting 3 full days to discussion of a single problem or practice. Groups are deliberately limited to not more than 17 persons. This preserves intimacy and spontaneity and insures that all will have a chance to participate. Pithy discussions prevail.

The limited groups are usually filled quickly after dates of seminars are announced. It is estimated that 1500 from management who wanted to attend have not been able to do so because groups were filled.

The expanded 1951-52 schedule will ultimately provide 200 groups, totaling 3000 participants. Subjects will cover all eight AMA divisions—finance, general management, insurance, marketing, office management, packaging, personnel and production.

Engineering Consultant Dies

Adolph Bregman, nationally known consulting engineer and a long time contributor to THE IRON AGE, died in New York last week at 61, after a brief illness.

Mr. Bregman had been executive secretary of the Masters Electro-Plating Assn. since 1933. A member of the American Institute of Mechanical Engineers, he also was a member of the American Electroplaters' Society, Electrochemical Society and Electrodepositors Technical Society of Great Britain.

CMP: Flush Out Duplicate Orders

Expect all fourth quarter tickets to be cashed in . . . NPA will help those with unfinished production . . . Hope more structurals for steel expansion . . . Defense needs rising.

National Production Authority officials repeated their belief last week that virtually all CMP tickets would be cashed for the fourth quarter.

Purpose of setting a cut-off date of Oct. 7 for shipment of third quarter allocations was to force uncancelled orders into the open.

Officials said help could be given on an individual basis to those who actually needed additional shipments of materials to finish partially completed production.

Next Year — Meantime, DPA Chief Manly Fleischmann said NPA will try to increase substantially the allocation of structurals for steel industry expansion. Increases, however, will be mostly for those portions of the industry which are lagging or holding back the over-all production.

Outlook for the first quarter, Fleischmann said, is for an increase of at least 200,000 additional tons of carbon steel.

But the control chief said that this would mean little to civilian producers. Most of the increase will be eaten up by increasing military requirements.

Defense needs for the first quarter had not been settled upon early this week. But there was no doubt that they would be higher for the first quarter and still more so for the second.

Truppner Replaces Skuce in NPA

William C. Truppner, a government career man, has replaced Walter C. Skuce as assistant administrator for production controls, National Production Authority.

Skuce has returned to his post as manager of the transportation products division of Owens-Corning Fibreglass Corp., Toledo. He was granted leave from his job last December to develop the controlled materials plan for NPA.

Aluminum Scrap Ceiling Amended

Government sales of wrecked planes containing aluminum scrap may now be made at lower-than-ceiling prices, with the amount of reduction depending on the shipping basis.

An amendment to the aluminum scrap ceiling price regulation (CPR 54) authorizes such transactions on an f.o.b. point of shipment basis, or on a "where is" basis. In the first instance, a 1½¢ per lb reduction will be made in the ceiling price listed in Table A, CPR 54; in the second, the change will be 2¢.

Estimated weight of the amount of recoverable aluminum alloy cannot exceed 85 pct of the total material advertised for sale.

Industry Controls This Week:

NPA Orders

M-6A—Requires steel mills to increase shipments to warehouses from 85 to 100 pct of base period.

M-70, Amend.—Continues priorities aid to ship operators, marine suppliers and ship repair yards.

M-86—Permits fourth quarter inventory replenishment for distributors of copper wire products.

OPS Orders

Supplementary Reg. 13, GCPR, Amend.—Extends coke price increase period to Dec. 31.

CPR 30, Amend. 17 — Provides alternate method of computing materials cost adjustments.

CPR 54, Amend.—Permits government sales of aluminum in wrecked planes at lower-than-ceiling prices.

CPR 67, Amend.—Requires machinery resellers to use manufacturers' discounts in period of Apr. 1 to June 24, 1950, in computing ceilings.

CPR 80—Sets new ceilings for all used machine tools and used extra parts.

Production

IRON & STEEL: August Production

As Reported to American Iron & Steel Institute

BLAST FURNACE —NET TONS DISTRICTS	Number of Companies	Annual Capacity	PIG IRON August	PIG IRON Year to Date	SPIEGEL, FERRO-MANGANESE August	SPIEGEL, FERRO-MANGANESE Year to Date	TOTAL August	TOTAL Year to Date	TOTAL Pct of Capacity August	TOTAL Pct of Capacity To Date
Eastern	12	13,870,680	1,106,941	9,063,174	27,976	218,623	1,134,917	9,281,797	96.3	100.5
Pitts.-Yngstn.	17	27,070,520	2,280,559	17,536,688	23,535	199,177	2,304,094	17,735,865	100.2	98.4
Cleve.-Detroit	6	7,110,600	606,907	4,569,215	.....	.....	606,907	4,569,215	100.5	96.5
Chicago	7	15,684,040	1,287,461	10,016,994	.....	5,694	1,287,461	10,022,688	95.6	96.0
Southern	9	5,310,740	444,740	3,571,602	6,601	60,803	451,341	3,632,405	100.0	102.7
Western	4	3,425,200	278,033	2,014,820	.....	.....	278,033	2,014,820	95.5	88.3
Total	38	72,471,780	6,004,641	46,772,493	58,112	484,297	6,062,753	47,256,790	98 5	97.9

STEEL —NET TONS DISTRICTS	Number of Companies	Annual Capacity	TOTAL STEEL (Incl. Alloy Steel, Carbon Ingots) August	TOTAL STEEL Year to Date	TOTAL STEEL Pct of Capacity August	TOTAL STEEL Pct of Capacity To Date	ALLOY STEEL August	ALLOY STEEL Year to Date	CARBON INGOTS August	CARBON INGOTS Year to Date
Eastern	25	20,823,230	1,654,636	13,644,588	93.5	98.4	135,091	1,113,203	318,446	2,624,668
Pitts.-Yngstn.	34	41,411,870	3,436,162	27,252,534	97.7	98.8	494,600	3,776,962	401,696	3,198,466
Cleve.-Detroit	8	9,601,940	838,914	6,443,080	102.8	100.8	73,963	529,979	99,940	809,073
Chicago	15	21,522,750	1,868,287	14,914,106	102.2	104.1	146,244	1,141,298	269,188	2,164,696
Southern	9	4,913,340	417,385	3,413,734	100.0	104.3	4,021	40,150	4,981	29,931
Western	11	5,956,520	518,208	4,016,898	102.4	101.3	12,167	87,853	35,998	266,464
Total	81	104,229,650	8,733,592	69,684,742	98.6	100.4	866,086	6,689,445	1,130,249	9,093,298

Change Machinery Resellers CPR

Changes in manufacturers' discount rates are key factors in a new amendment to the resellers' ceiling price regulation (CPR 67), applying to machinery and related manufactured items.

In determining his ceiling price, Office of Price Stabilization has ruled, a reseller can't use a manufacturer's published list figure if the latter has changed his discount policy since June 24, 1950. Some manufacturers are known to have amended their discount structure since the date named, thus changing the cost to the reseller.

Machinery Only—Now, the reseller must find his ceiling price by applying the percentage markup he used between Apr. 1 and June 24, 1950, to his basic cost of the items.

The amended regulation currently covers only machinery and those other items priced under Ceiling Price Regulation 30, plus brass mill products. Eventually, other industrial and semi-industrial items will be included in coverage of CPR 67.

Copper Wire Replenishment O.K'd.

New copper National Production Authority order (M-86) sets up an inventory replenishment period in the fourth quarter during which distributors of copper wire-mill products may use the "X6" symbol to replace stock sold out of inventory on ACM orders.

This procedure becomes operative Nov. 1, subject to limitations defined in the order. Order revokes the temporary procedure under Dir. 1, M-11.

Warn No 1952 Tinplate Increase

Tinplate industry has been warned by National Production Authority not to expect any larger allocations for first-quarter 1952 than were given for fourth-quarter 1951.

Meeting with NPA, industry advisory committee members complained that Dir. 7, CMP-1—which provides that unfilled orders not shipped as of Oct. 7 must be charged against fourth quarter allotments—will work a hardship on both mills and varied customers.

There was no indication, however, that NPA would relax the order.

Brass Exporters Must File Data

Exporters of plumbers' brass goods must submit export sales data for 1949, 1950, and first-half 1951 with the Office of International Trade before Nov. 15. This applies to those who expect to file applications as well as those who have applications pending.

Applicants must also submit

proof of availability of materials in order to obtain license approval.

In another action, OIT reminded exporters of totally-allocated metals to file copies of their requests to NPA for allocations.

Mills to Up Warehouse Shipments

Steel mills will be required to increase shipments to warehouses, starting Jan. 1, from the present rate of 85 pct of base period to 100 pct.

National Production Authority is issuing this order (M-6A) last week, defined the base period as Jan. 1-Sept. 30, 1950. Order is applicable to products named in CMP List A.

Orders must be placed with the mills in accordance with lead times established in CMP Reg. 1. Distributors are not required to make delivery from inventory to any one customer at any one destination in one calendar week of a steel product in excess of:

Carbon steel, 8000 lb; alloy steel, 5000 lb; stainless steel, 2000 lb; stainless bars and plates, 1000 lb; and stainless tubing or pipe, 1000 lb or ft, whichever is less.

Add to Self-Authorization List

Grain elevators, feed mills, and terminal warehouses have been reclassified for construction purposes by National Production Authority as industrial, rather than commercial, installations.

This means builders of the foregoing projects may self-authorize orders for controlled materials up to 25 tons of steel, 2000 lb of copper, and 1000 lb of aluminum per quarter.

Commercial construction is permitted self-authorization only for 2 tons of steel, 200 lb of copper, and no aluminum per quarter.

Coke Price Hike Period Extended

Producers of coke and coke products can act at any time before midnight, Dec. 31, to adjust ceiling prices to include increased delivered costs of raw materials.

Cooling Generators:

New electric generator cooling system will save steel, copper.

New designs for electric generator cooling systems will effect important savings in steel and copper when expanding generating capacity. Allis-Chalmers already has such a new system in operation, while Westinghouse will announce a similar cooling device shortly. General Electric will follow suit later.

Generally speaking, heat produced in a generator limits the amount of electricity the unit can produce. If heat can be removed faster, greater power output can be obtained with a given size of generator. Faster heat dispersal through Allis-Chalmers' new cooling system will save 30 to 40 pct of the copper and steel ordinarily used in conventional 60,000 kw generators.

Gas Cooled—In recent years, hydrogen cooling has replaced the traditional forced-air method for large generators. New designs force the hydrogen at much higher velocities than before directly over the copper conductor surfaces of the rotor.

A two-stage centrifugal compressor mounted on the rotor shaft is used by Allis-Chalmers to achieve the new high velocities. Copper windings are specially shaped to speed heat dispersal. Test data show that the hydrogen travels the full length of a 60,000 kw generator in less than 1/50th of a second. In this short time the gas absorbs enough heat to raise its temperature to 90°F.

Other Savings—Smaller size and lighter weight of units employing the new design will reduce power house construction costs, important in power expansion plans. In addition, short-circuit currents are reduced, with consequent savings in the cost of circuit-breakers and other protective equipment. Further refinements of the principle may well result in even greater savings.

—Defense Contracts—

Contracts Reported Last Week

Concrete finisher—Smith Booth Usher Co., Los Angeles.

Compressor—Le Roi Co., Milwaukee.

Concrete spreader—Blaw-Knox Co., Pittsburgh.

Road grader—Rome Grader Corp., Rome, N. Y.

Crushing, screening plant—Iowa Mfg. Co., Cedar Rapids, Iowa.

Crushing, screening plants — Pioneering Works, Inc., Minneapolis.

Flashlights—U. S. Elec. Mfg., New York.

Jack, telephone—Western Electric Co., Inc., New York.

Flood valves for submarines—Electric Boat Co., Groton, Conn.

Volt-Ohmeters—Hickock Electrical Instrument Co., Cleveland.

Fasteners, Slide—AAA Slide Fasteners, Inc., Brooklyn.

Connectors—Maine Specialty Co., Portland, Me.

Locks, padlocks—E. T. Fraim Lock Co., Inc., Lancaster, Pa.

Locks, padlocks—Chicago Lock Co., Chicago.

Valves, check swing disk type—The Williams & Wells Co., New York.

Pump, centrifugal—Ralph B. Carter, Hackensack, New Jersey.

Tractor, wheel—J. I. Case Co., Racine, Wis.

Spare Parts—Galion Iron Works & Mfg. Co., Galion, Ohio.

Indicator, Sub Assy.—Raytheon Mfg. Co., Waltham, Mass.

Tube tester—The Daven Co., Newark, N. J.

Teletypewriter Switching Center — Kleinschmidt Labs., Inc., Deerfield, Ill.

Flashlight—Bright Star Battery Co., Clifton, N. J.

Antenna Mast—Modecraft Co., Inc., Brooklyn.

Pen Drive Assy.—McElroy Mfg. Corp., Littleton, Mass.

Repair parts for control devices and compressors—The Westinghouse Air Brake Co., Wilmerding, Pa.

Motors—Diehl Mfg. Co., Somerville, N. J.

Relief valves—Manning Maxwell & Moore, Inc., Bridgeport, Conn.

Repair parts for recording instruments—The Bristol Co., Waterbury, Conn.

Valves and automatic control equipment—Grove Regulator Co., Oakland, Cal.

Repair parts for wire recorders—The Brush Development Co., Cleveland.

Repair parts for diesel engines—American Bosch Corp., Springfield, Mass.

Repair parts for steam boilers—Thomas C. Wilson Co., Long Island City, N. Y.

Repair parts for valves—Schutte & Koerting Co., Cornwells Heights, Pa.

Repair parts for steam engines—Skinner Engine Co., Erie, Pa.

Repair parts for diesel engines—Sun Shipbuilding & Drydock Co., Chester, Pa.

Repair parts for regulators—Leslie Co., Lyndhurst, N. J.

Repair parts for turbines—General Electric Co., Philadelphia.

Repair parts for switchboard & control equipment—Ward Leonard Electric Co., Mt. Vernon, N. Y.

Rod, drain valve extension—The Greb Co., Stoughton, Mass.

Projectile—Pantex Mfg. Corp., Pawtucket, R. I.

Metal parts for Fin, Mortar—Precision Castings Co., Syracuse, N. Y.

Relays—R-B-M Division, Essex Wire Corp., Logansport, Ind.

Air Conditioning Units — Fedders Quigan Corp., Chevy Chase, Md.

Travelling Bridge Crane—Harnischfeger Corp., Milwaukee.

Boat, Utility, Diesel—The Oxford Boatyard Co., Oxford, Md.

Main gasoline pumps—Worthington Pump & Machinery Corp., Harrison, N. J.

Lubricating oil pumps—Turbine Equipment Co., New York.

Defense Contracts

Radio receiver, test set kit—Philco Corp., Philadelphia.

High vacuum pumps—Bench Russ Co., New York.

Gun carriages for 280 MM—Baldwin-Lima Hamilton Corp., Eddystone, Pa.

Hydraulic Fittings—The Weatherhead Co., Detroit.

Parts for 75 M/M Gun—Eagle Tool & Machine Co., Springfield, Ohio.

Lock washers, shackles, etc.—Graybar Electric Co., Inc., Washington.

Spare parts, Fire Control Equipment—Arma Corp., Brooklyn.

Periscope Mounts—Gilbert & Barker, West Springfield, Mass.

Boring and turning mill—Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation no. or proposal, and opening date. (Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q.")

Oiler steel, 800, 52-45B, Oct, 29.
Bracket tr. susp. wheel assy., 840, (52-PLUS-381B), Oct. 26.
Door drivers escape hatch assy., 1003, 52-381B, Oct. 26.
Joint w/connector assy., 800, 52-204B, Nov. 13.
Inspection Gages, M174 Fuze, 74 itms, (CML-11-3 to ea 021-52-10B), Oct. 15.
Adzer, gasoline driven, 30 ea, B65B, Oct. 25.
Indicator—tachometer, 675 ea, 52-5007-Q, Oct. 15
Generator—tachometer, 675 ea, 52-5007-Q, Oct. 15.
Grinder, rail, gasoline driven, 66 ea, B65B, Oct. 25.
Hammer, gas driven, 66 ea, B65B, Oct. 25.
Jack, power, 30 ea, B65B, Oct. 25.
Puller, spike, 30 ea, B65B, Oct. 25.
Saw, rail cutting, 28 ea, B65B, Oct. 25.
Gage, track, RR, std, gage, 300 ea, BN72Q, Oct. 15.
Drill, track, 115 ea, BN74Q, Oct. 16.
Drill twist, 216 ea, BN74Q, Oct. 16.
Lathes, 11, 2064-Q, Oct. 18.
Thermocouples, 1500 ea, 83B, Oct. 26.
Hoist electric 1000 lbs, 50, 52-405B, Oct. 25.
Cap 40-H-548BIN revolving floor type, 400, 52-409B, Oct. 25.
Compressor, air, 20, 52-408B, Oct. 25.
Compressor, air, 50, 52-408B, Oct. 25.
Plate, assembled, 2200 to 3000 ea, 29314 Q, Oct. 18.
Bolt assy., 850 to 2000 ea, 28995 Q, Oct. 18.
Retainer, 20 MM gun, 1730 to 5000 ea, 28995 Q, Oct. 18.
Springs for 20 MM gun, 1930 to 5000 ea, 28995 Q, ea, Oct. 18.
Housing, recoil assy., 500, 28988 Q, Oct. 17.
Buffer, rear assy., 320, 28988 Q, Oct. 17.
Refrigerating unit, 47 ea, Q, Oct. 15.
Governor assy., 5 ea., 52-8, Oct. 8.
Tachometer assy., 133 ea, 52-8, Oct. 8.
Motor assy, 10 ea, 52-8, Oct. 8.
Distributor assy., 56 ea, Oct. 8.
Spotlight assy., 20 ea, 52-8, Oct. 8.
Spotlight assy., 123 ea, 52-8, Oct. 8.
Lamp assy., 70 ea, 52-8, Oct. 8.
Sirenlite assy., 28 ea, 52-8, Oct. 8.
Regulator assy., 165 ea, 52-8, Oct. 8.
Magneto assy., 45 ea, 52-8, Oct. 8.
Starter assy., 106 ea, 52-8, Oct. 8.
Valve assy., 27 ea, 52-8, Oct. 8.
Motor assy., 440 ea, 52-8, Oct. 8.
Winch assy., 21 ea, 52-8, Oct. 8.
Take-Off assy., 26 ea, 52-8, Oct. 8.
Shaft assy., 14 ea, 52-8, Oct. 8.
Ring & Cover assy., 116 ea, 52-8, Oct. 8.
Reel assy., 30 ea, 52-8, Oct. 8.
Transmission assy., 66 ea, 52-8, Oct. 8.
Gear assy., 5 ea, 52-8, Oct. 8.

—Financial—

Chicago Investment Plans Down

Plans for investment in new industrial facilities in the Chicago area announced during September involved a total expenditure of $14,889,000, compared with $18,143,000 in August and $21,563,000 announced in September, 1950. The total investment plans announced during the first 9 months of 1951, according to the Chicago Assn. of Commerce and Industry, was $266,378,000, which compares with the total of $272,609,000 for the same period in 1950.

Continental Can Plans New Issues

Continental Can Co. plans to issue $15 million worth of bonds and 250,000 shares of second preferred stock to finance its major expansion program. Stockholder approval of the issue and of a common stock increase will be asked at a special meeting Oct. 22. Goldman, Sachs & Co. and Lehman Bros. are expected to be chief underwriters of the new issues.

Fast Tax Write-Offs

Latest DPA certificates listed by company, use, amount applied for, amount eligible, and pct approved:

Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass., aircraft parts, $20,653, $20,653, 75.

The Atrax Co., Newington, Conn., carbide cutting tools, $67,460, $67,460, 80.

E. D. Jones & Sons Co., Pittsfield, Mass., military items, 75.

Union Carbide & Carbon Corp., Bennington, Vt., military items, 75.

Boston Electro Steel Casting, Inc., Boston, steel castings, 75.

Hartford Machine Screw Co., Windsor, Conn., cap screws, $73,041, $73,041, 75.

Radio Corp. of America, Camden, N. J., shoran system, 75.

Kenyon Instruments Co., Inc., Long Island, N. Y., aircraft parts, 90.

Fairchild Engine & Airplane Corp., Long Island, N. Y., aircraft equipment, $2,000,000, $1,940,000, 75.

Consolidated Machine Tool Corp., Rochester, N. Y., boring mills, $156,342, $156,342, 90.

August W. Holmeberg & Co., Inc., New York, dies, tools, jigs, 90.

Westinghouse Electric Corp., Baltimore, military items, 75.

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., process units, 75.

Cumbustion Engineering-Superheater, Inc., Chattanooga, Tenn., steam generating units, 60.

United Gas Corp., Biloxi, Miss., military base facilities, $51,467, $51,467, 50.

Atlanta & West Point R.R. Co., locomotives, 65.

General American Trans., Masury, Ohio, pressure vessels, 60.

Cleveland City Forge Co., Cleveland, turnbuckles, 60.

The Crucible Steel Casting Co., Cleveland, steel castings, 75.

The Cyril Bath Co., Cleveland, dies, $8,019, $8,019, 90.

The Mosler Safe Co., Hamilton, Ohio, machine tools, $279,015, $279,015, 85.

Detroit Reamer & Tool Co., Detroit, cutting tools, $25,918, $25,057, 75.

Shakespeare Co., Kalamazoo, Mich., flight instruments, 75.

The Gross Co., Detroit, machine tools, 80.

Lakey Foundry & Machine Co., Muskegon, Mich., steel castings, 75.

The Chris Erhart Foundry & Mach. Co., Cincinnati, gray iron castings, 75.

Cadillac Gage Co., Detroit, gages, measuring instruments control valves.

The Hines Flask Co., Cleveland, pattern plate pins, 75.

Commercial Research Labs., Inc., Detroit, flowmeters, $27,366, $22,366, 75.

Keller Tool Co., Grand Haven, Mich., pneumatic tools, $53,356, $53,356, 90.

The Motch & Merryweather Machinery Co., Euclid, Ohio, machine tools, $669,460, $669,460, 80.

The Staples Tool Co., Cincinnati, cutting tools, $100,080, $100,080, 80.

The Ohio Rubber Co., Willoughby, Ohio, tank tracks, 75.

Michiana Products Corp., Michigan City, Ind., nickel alloy castings, 75.

Sterling Steel Casting Co., Monsanto, Ill., steel castings, 75.

Westmore Reamer Co., Milwaukee, tools, $64,009, $64,009, 90.

Bennett Industries, Inc., Peotone, Ill., military items, 75.

Ekco Products Co., Chicago, military items, 75.

Stiger Precision Products, Inc., Chicago, military items, 85.

C. A. Dunham Co., Michigan City, Ind., projectiles, 75.

Pullman-Standard Car Mfg. Co., Michigan City, Ind., freight cars, 60.

Mattison Machine Works, Rockford, Ill., machine tools, 80.

Russakov Can Co., Chicago, gasoline cans, 60.

Calumet Steel Castings Corp., Hammond, Ind., steel castings, $11,020, $11,020, 75.

E. C. Styberg Engineering Co., Racine, Wis., military items, $29,612, $29,612, 85.

Scully-Jones and Co., Chicago, machine tool accessories, $341,515, $338,515, 80.

Michiana Products Corp., Michigan City, Ind., nickel alloy castings, 75.

Sterling Steel Casting Co., Monsanto, Ill., steel castings, 75.

Westmore Reamer Co., Milwaukee, Wis., tools, $64,009, $64,009, 90.

Bennett Industries, Inc., Peotone, Ill., military items, 75.

Ekco Products Co., Chicago, Ill., military items, 75.

Donaldson Co., Inc., St. Paul, Minn., military parts, 85.

The Hubinger Co., Keokuk, Iowa, industrial, $196,071, $196,071, 40.

Dixon Mfg. Co., Inc., Coffeyville, Kans., spare parts for aircraft, 85.

Pacific Pumps, Inc., Huntington Park, Calif., pumps, 75.

Pacific Pumps, Inc., Huntington Park, Calif., pumps, 75.

Telecomputing Corp., Burbank, Calif., electronic computing equipment, 85.

O & M Machine Co., Los Angeles, aircraft parts, 85.

H. W. Loud Machine Works, Inc., Pomona, Calif., wing fittings—(aircraft), $88,110, $88,-110, 90.

Hi-Shear Rivet Tool Co., Los Angeles, fasteners, 85.

Norris Stamping & Mfg. Co., Los Angeles, military items, 75.

Steel Inquiries and Awards

Fabricated Steel Awards this week include the following:

1062 **Tons,** Fall River and Freetown, Mass., new $18,000,000 Expressway bituminous concrete, bituminous macadam and eight bridges; includes three span steel stringer bridge over Assonet River; two span steel stringer bridge over South Main St., Freetown, and two span steel stringer bridge, to DeMatteo Construction Co., Quincy, Mass.

1000 **Tons,** Folsom, Cal., Bureau of Reclamation Penn Stocks for power plant spec. DS 3511, to Southwest Welding and Mfg. Co.

800 **Tons,** Colorado Springs, Colo., Municipal power plant, to Kansas City Structural Steel Co.

550 **Tons,** Milwaukee, Wis., Juneau Bascule Bridge, to Amercian Bridge Co.

535 **Tons,** Wapello City, Iowa, Bridge project Wrer-390, to Pittsburgh Des Moines Steel Co.

430 **Tons,** South Beloit, Ill., Plant for Besly Co., to Joseph T. Ryerson and Sons.

305 **Tons,** Fall River and Freetown, Mass., new $18,000,000 Expressway, to DeMatteo Construction Co., Quincy, Mass.

260 **Tons,** Blackhawk City, Iowa, Bridge project F 200/0, to Pittsburgh Des Moines Steel Co.

260 **Tons,** Indianapolis, Ft. Benjamin Harrison boiler house, to Ingalls Iron Works.

125 **Tons,** Monana, Iowa, Bridge project Fn-861, to Pittsburgh Des Moines Steel Co.

Fabricated Steel Inquiries this week include the following:

600 **Tons,** South Dakota, Penn stocks for Engineers Corps, U. S. Army at Omaha office.

420 **Tons,** Chicago, O'Hara Field, Track relocation work. Acco Midwest Co., general contractor.

Reinforcing Bar Awards this week include the following:

105 **Tons,** Macomb, Ill., Armory, Illinois National Guard, J. J. Altman Construction Co., Contractor, to Laclede Steel Co.

'51 Construction at $22 Billion

Construction through the first 9 months 1951 totals more than $22,000,000,000, Commerce Dept. reports.

This is comparable to the total for all of 1949, and 10 pct, or $2,000,000,000, more than for the 9-month period of 1950 when the year's total went to a new high of $28,000,000,000.

Outlook for the present quarter apparently is still a wait-and-see one. Construction materials came under CMP as of Oct. 1, but contractors are permitted to use up materials in their possession at the end of September.

Residential construction has leveled off, the government says, and commercial building is below the 1950 rate.

Steel Wage Rise Gets Solid Backing

White House people will stand behind steelworkers . . . OPS to be shown as impotent innocent . . . Other unions may follow trend . . . Congress will watch spending—*By George Baker.*

Forthcoming CIO-United Steelworkers' demands for higher wages and increased fringe benefits will be backed to the hilt by people close to the White House.

Decision to go all-out in backing Philip Murray's soon-to-be-announced demands has been reached by President Truman's policymakers over the bitter protests of hold-the-line advocates in price and wage control quarters.

Official justification of the proposed increase will be pitched to the theme that retail price rises in recent months have cancelled any obligation on labor's part to settle for small or token increases.

Hands Tied—Government price stabilizers, in the coming hassle, will be depicted as zealous exponents of a rigid anti-inflation policy whose hands have been tied by a "meaningless" price-control law.

Eric Johnston, who reports to Defense Mobilizer Charles E. Wilson on price and wage control measures, puts it this way:

"We will continue to hold the line for another 4 or 5 months. . . . After that I cannot predict, because there are too many imponderables."

Liberal on Pensions—Wage Stabilization Board officials already have hinted that they intend to follow a "liberal" policy on pension, health, and welfare issues. Industry representatives at WSB are protesting the pursuit of such a line, but a counting of noses at the agency shows that this industry point has only the slimmest chance of winning out.

Actually, Johnston is well aware that over-the-ceiling wage and benefit boosts for the USW will sound the hunting horn for other unions and for countless price rises. But he believes he can duck any avalanche of public criticism by loudly protesting "an ineffectual control law" before resigning to return to his permanent position as head of the Motion Picture Assn.

Won't Settle—USW's current contract with principal steel producers expires Jan. 1. Pay-increase formula now being exercised by the government would permit a 4¢-per-hr increase, but few officials expect Murray to settle for anything like this figure.

Spend Wisely—Conference committee approval of the $57 billion defense money bill, a record for peacetime, doesn't mean Congress is prepared to vote huge military budgets, year after year.

Two senior lawmakers, Sens. Joseph C. O'Mahoney, D., Wyo., and Henry C. Lodge, Jr., R., Mass., called for more economical arms planning before the bill was presented to the House and Senate for final consideration. Prominence of these men in the field of Capitol-Pentagon relations enhances the likelihood that their words will be heeded.

Pay-As-We-Go—As O'Mahoney sees it, the provision of a pay-as-we-go economy in the United States should remain the principal objective of government policy.

He calls for Congress to make a serious effort in this direction by refusing to authorize new expenditures of a non-essential nature, and points out the disparity between the amount of new revenue expected as a result of tax increases and the sum that would be needed to finance contemplated military expenditures.

Only in War—Real reason for Sen. J. O'Mahoney's decision to break with the White House over spending policies can be traced to the decision of Chairman Walter George, D., Ga., of the Senate Finance Committee, to support no further tax increases unless the country becomes involved in an all-out war.

Tax bill now nearing enactment is the last he will support, "short of an all-out war, or a war crisis," George declares. Actually, grave concern is being expressed by key members of both parties as to whether tax rates will not soon be at capacity levels.

What's the Limit?—George points out there is no fixed limit to the amount of taxes that can be collected without injuring the economy. Limit is reached, he says, only when the tax-take destroys the incentive of the people, and when it leads to every conceivable effort to evade and to wasteful practices by the taxpayers.

DPA, NPA Merger Asked

Merger of Defense Production Administration with National Production Authority would clear up some of the confusion in the mobilization program, House Small Business Committee suggests.

Present setup, the committee says, results in "the odd situation of the administrator of DPA, the policy-making agency, figuratively walking across the street to NPA, the operational agency, to tell himself to put into effect as NPA administrator the policies he has decided upon as DPA administrator."

Relief for Shops . . .

ABOUT TO BURST THEIR PRODUCTION SEAMS

Worried about growing pains? Perhaps a better way to increase production would be with the aid of new, faster machine tools. One thing's for sure —if you're concerned with milling operations on large quantities of small parts, you can produce them faster and at lower cost on CINCINNATI No. 0-8 Milling Machines. And you may probably gain an extra advantage of smaller floor space—the 0-8's require very little, and they can readily be integrated with conveyors. ¶ You have a choice of four CINCINNATI No. 0-8 Milling Machines:

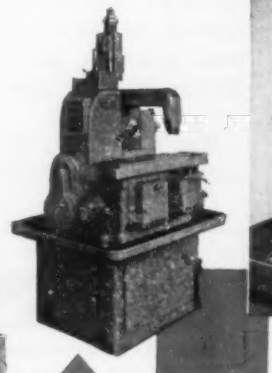
1) No. 0-8 Plain Automatic
2) No. 0-8 Automatic Rise and Fall
3) No. 0-8 Vertical, longitudinal table feed
4) No. 0-8 Vertical, rotary table feed

A few examples of the type of work handled by these efficient, hard working machines are illustrated here. Do they give you ideas? Complete data about CINCINNATI No. 0-8 Millers may be obtained by writing for the literature indicated in the captions.

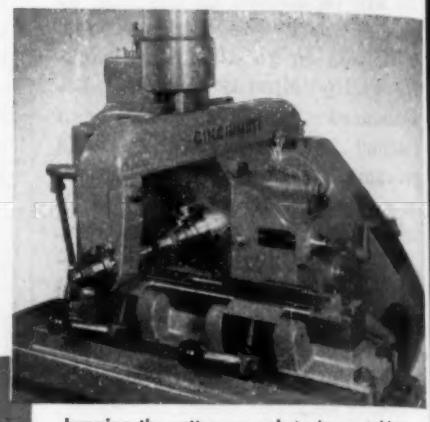
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

CINCINNATI No. 0-8 Plain Automatic Miller. Catalog No. M-1607-1.

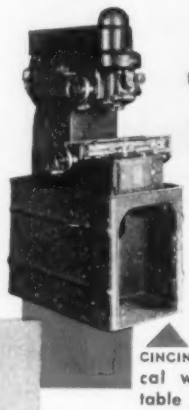
CINCINNATI No. 0-8 Automatic Milling Machine with hydraulic rotary milling fixture to form mill grooves on the O.D. of two sizes of saw shanks. Production . . . 175 per hour.



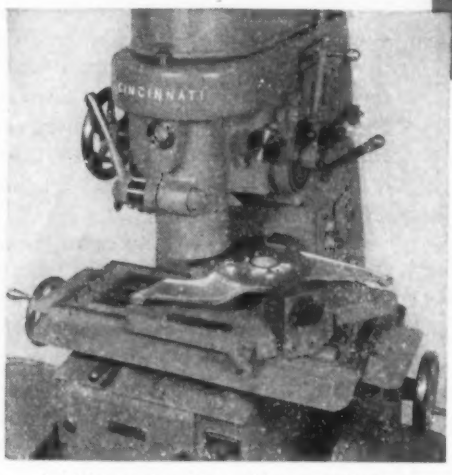
CINCINNATI No. 0-8 Automatic Rise and Fall Milling Machine. Catalog No. M-1607-1.



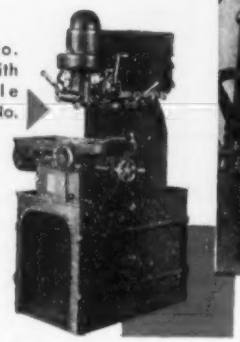
Jumping the cutter over obstacles or taking two or more aligned cuts are specialties of CINCINNATI No. 0-8 Rise and Fall Automatics. In this example two keyways are milled in one cycle. Production . . . 101 per hour.



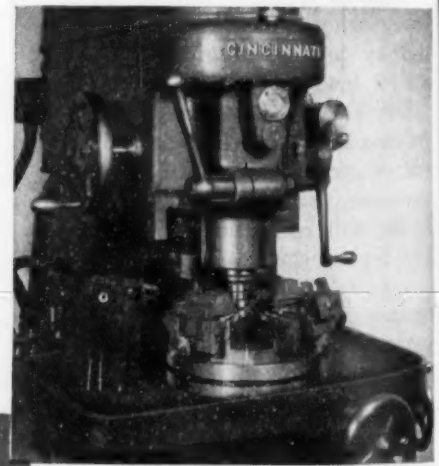
CINCINNATI No. 0-8 Vertical with conventional table feed. Catalog No. M-1532-2.



A high speed carbide milling operation on a CINCINNATI No. 0-8 Vertical, milling the bottom of an aluminum brake shoe support. Production . . . 120 per hour.



CINCINNATI No. 0-8 Vertical with Rotary Table Feed. Catalog No. M-1199-3.



CINCINNATI No. 0-8 Vertical with Rotary Table tooled up for an unusually high production job of milling bevels on the end of firing pins. Production . . . 530 per hour.

CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES
BROACHING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

POWER: Shortage Theories at Odds

Chapman, Fleischmann disagree on supply . . . Metals program in danger . . . DPA picks survey committee . . . Northwest most critical area . . . Defense Dept. wants expansion at any cost.

Cleavage in the viewpoints of Interior Secretary Oscar Chapman and Defense Production Administrator Manly Fleischmann on the topic of power availability in the Northwest isn't going to be helped by DPA appointment of a power-needs survey group.

Must Use Head—Chapman holds the opinion that the worst is yet to come in the electric output field, but argues that all energy demands can be met "if we use intelligence." He predicts the power shortage in the winter of 1952 will be worse than any experienced during World War II.

Material shortages and growing defense and civilian demands, he says, are complicating the power problems in electrical and petroleum fields.

Committee Named—Fleischmann took action on the power question when it became apparent to DPA that production of aluminum and other vital metals was being reduced. To study U. S. needs for expanded electric energy in the next several years, he named to the committee Edward W. Morehouse, vice-president, General Public Utilities Corp., N. Y. C., chairman; Ralph Booth, Jackson and Morland, Engineers, Boston; Herbert Marks, Washington, attorney, and G. O. Wessenauer, power manager, Tennessee Valley Authority.

Building Guide—DPA intends to be guided by the committee's findings when issuing permits for new power construction. It's the power industry's plan to increase total annual capacity from 70 to 97 million kw by 1954.

This total includes a planned completed expansion totaling 7.7 million kw by the end of this year, an additional growth of 9.5 million in 1952, and about 9.8 million in 1953.

Reactivate Palisades? — One project which may be reactivated to provide added power in a critical area is the Palisades Dam and power plant on the Snake River in Eastern Idaho. President Truman has asked Congress for $2,000,000 to renew work on the dam, begun several years ago but suspended. If Congress approves and reactivation starts immediately, power generation would not be expected before 1956.

The DPA power committee will work in conjunction with Defense Electric Power Administration—which backs industry's expansion plan—and with Interior and the DPA Office of Program and Requirements. Members are instructed to advise Fleischmann on development of a program that will suffice for defense needs.

As an emergency measure, the DPA head asserted, he would not hesitate to order a brownout in the power-shy Pacific Northwest area.

"We need backing to hunt uranium."

Defense Worried—Greatly concerned at the prospect of slower delivery of metals, Defense Dept. is reported to favor "any steps" to boost power output in the area named. Munitions Board official Robert M. Hatfield estimated that about 36,000,000 lb of aluminum per month have been lost as a result of the shortage, and that 1,500,000 lb of magnesium "will shortly" be lost, also.

Start Chrome Output at Once

Immediate action in obtaining chrome concentrates from the Mouat mine in Montana is favored by Defense Minerals Administration, which has approved a production plan submitted by American Chrome Corp.

DMA favors the granting of a $4,500,000 government loan to rehabilitate the mine mill. However, Defense Production Administration and Reconstruction Finance Corp. must give approval before the loan can be effected.

George Holderer, of DMA's manganese branch, said the Stillwater County, Mont., mine is the outstanding source of chrome ore in the U. S. Its production capacity, he said, is 125,000 tons of chrome concentrates per year.

Gorrie Nominated NSRB Head

Jack O. Gorrie, a former Seattle, Wash., newspaperman, has been nominated by President Truman to be chairman of the National Security Resources Board. He has been acting NSRB chairman since April, when W. Stuart Symington resigned to become head of the Reconstruction Finance Corp.

Koehler Heads Renegotiation

Chairmanship of the U. S. Renegotiation Board is the new responsibility of John G. Koehler, until recently Assistant Secretary of the Navy.

Industrial Briefs

Budd Building—BUDD CO., Philadelphia, has started construction of a new plant to machine, weld and paint tank hulls and turrets for the Army under a subcontract from the Chrysler Corp. The 2-story structure will be erected adjacent to Budd's present automobile body components plant.

New Line—GREAT LAKES STEEL CORP., Stran-Steel Div., manufacturer of Quonset buildings, have added to its line the "Quonset Long-Span." The new structure is suitable for most industrial and commercial requirements.

Liquid Gold—The black, sludgy, used oil drained out of aircraft engines in reality is "liquid gold" for the U. S. Air Force. Through a re-refining process, approximately 1 million gal of used aircraft engine oil were put back into use during the past year.

Overseas—The formation of a new company to be known as NORTON BEHR-MANNING OVERSEAS, INC., was announced by Norton Co., and Behr-Manning Corp., Troy, N. Y. The company will handle the export business and direct the subsidiary plant operations of the two corporations throughout the world. Headquarters will be in Worcester.

Name Changes—The new trade name FABCON, INC., Trenton, N. J., identifies the old firm of Industrial Contractors, Inc.

New Home — PRECISION METALSMITHS, INC., have moved into their new home at 1081 E. 200th St., Cleveland. The new location provides for added facilities and improved equipment.

Nears Completion — Passaic River Bridge, one of the two longest spans of the New Jersey Turnpike, is another step closer to completion with the erection of the final 2-haunch girders by BETHLEHEM STEEL CO. The 115-ft closing girders of the 375-ft river crossing will be erected next, approximately a month before the scheduled opening of the 118-mile super highway.

Domestic, Foreign—HARBISON-WALKER REFRACTORIES CO. has acquired the Warm Springs, Calif., plant of Laclede-Christy Co., Chicago, for production of basic and silica refractories. The company also has organized a Brazilian subsidiary to mine large deposits of exceptionally pure magnesite in Brazil.

Acquisition—COPPERWELD STEEL CO. has set up Flexo Wire Co., Inc., Oswego, N. Y., as a wholly owned subsidiary after acquiring all outstanding stock. Flexo has a capacity to produce small and fine sizes of Copperweld, copper and bronze wires and cables at the rate of more than 500,000 lb per month.

Lecture Tour — Edward L. Hughes, currently on leave of absence from his position as assistant to the president of LEVINSON STEEL CO., Pittsburgh, will be lecturing in Oslo, Norway, for the next 3 weeks on "Production Planning and Control." The lecture series is part of the industrial exchange plan of the Economic Cooperation Administration.

EASY BRAZING: Brazing is proving cheaper and better than mechanical joints on Aluminum Products Co., Houston, extruded aluminum windows. The girls who do the brazing need have had no previous experience.

Canadian Expansion — RUST FURNACE CO., Pittsburgh, will design and build a new billet heating furnace and three batteries of soaking pits for the Algoma Steel Corp., Ltd., Sault Ste. Marie, Ont.

Traffic Record—The volume of freight shipped on inland waterways during the first 8 months of this year indicates that new traffic records will be set during 1951. The increase is expected to come to 15 pct or more over the previous high set in 1950.

Looking Ahead—For possible expansion of ingot mold capacity, VULCAN MOLD & IRON CO., Latrobe, Pa., has bought a 30-acre plant site at Delanco Township, N. J., within the district of the new Fairless Works of U. S. Steel Co.

In Operation — OHIO FERRO-ALLOYS CORP.'s new plant at Brilliant, Ohio, has begun operations. The plant is the first new ferroalloy plant conceived and put into operation since National Production Authority urged expansion of the industry to meet defense needs.

Exclusive Rep.—Lienhard & Co., La-Chaux-de-Fonds, Switzerland, manufacturers of high precision engraving machines, pantographs and similar equipment, have appointed CARL HIRSCHMANN CO., Manhasset, N. Y., their exclusive U. S. representative.

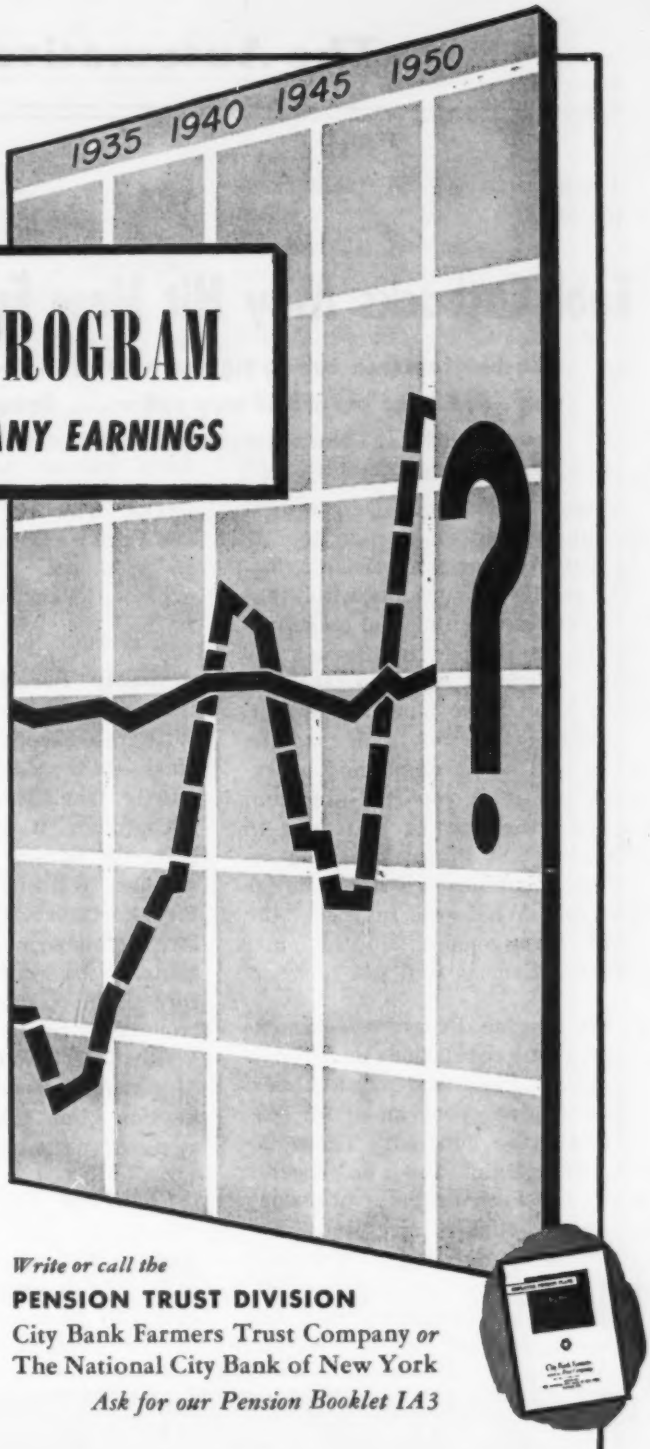
Plant Opened—W. C. Stolk, president of AMERICAN CAN CO. formally opened the firm's new multi-million-dollar Chatham, Ont., container manufacturing plant. The new plant has an annual production capacity of 300,000,000 cans. It has 185,000 sq ft of floor space and is located on a 50-acre site.

Announcing—An examination for engineers (Grades GS-5 through GS-15) to fill positions in all branches of engineering including Aeronautical, Civil, Electrical, Electronics, Mechanical, Naval Architecture, Petroleum, etc. Apply to U. S. Civil Service Commission, Washington 25, D. C.

Patterns in Pensions

YOUR RETIREMENT PROGRAM

SHOULD BE GEARED TO YOUR COMPANY EARNINGS



IF your company
EARNINGS ARE STEADY

Your company probably can afford the permanent commitment of an adequate pension system.

IF your company
EARNINGS ARE ERRATIC

Your company probably can best solve the retirement problem through a deferred profit-sharing trust—or a combination of a modest fixed pension commitment plus a profit-sharing retirement plan.

FIND OUT what plan BEST fits your business

Let us help you with complete analyses, including cost estimates. There is no obligation, of course.

Write or call the
PENSION TRUST DIVISION
City Bank Farmers Trust Company *or*
The National City Bank of New York
Ask for our Pension Booklet IA3

We Act As Trustee Under Pension Plans and as Agent for Individual Trustees

CITY BANK FARMERS TRUST COMPANY

CHARTERED 1822

HEAD OFFICE: 22 WILLIAM STREET, NEW YORK

Affiliate of

THE NATIONAL CITY BANK OF NEW YORK

ESTABLISHED 1812

Tool Cutbacks May Hit New Engines

Washington seen taking tighter hold of civilian product tooling . . . Engine programs may suffer . . . Debuts of '52 models may be late . . . Nash gets new body—*By Walter Patton.*

Reports persist in Detroit that a tighter hold on civilian tooling is being forged in Washington. The earliest rumors indicated that all civilian machine tool deliveries might be stopped in the next 30 days. Reports now indicate this plan may be softened somewhat.

Control over civilian machine tools will be accomplished by indirection it is reported—by controlling the flow of materials to machine tool builders having civilian machines on their order boards. Whatever may be the final arrangement, civilian machine deliveries will get tougher.

Hit Engine Programs—Assuming the new regulations go through as anticipated, at least two new auto engine programs are expected to be hard hit. These involve the Buick and Ford tractor engines. Both of these programs are being pushed hard.

Similarly, the Dodge, Ford V-8 and Mercury will be set back although these programs have not been particularly active in recent weeks. The new DeSoto, Lincoln and Ford 6 engines will go through as predicted. Introductions are expected sometime after Jan. 1, 1952.

Mostly Facelifting — Introductions of 1952 models will be late. With the exception of Ford and Nash—new model changes will be mostly facelifting.

Chrysler, it is expected, will start the parade sometime in November. GM introductions are set for sometime later—probably very late December or January. It will probably be February or later before the new Ford models are introduced. Nash will follow Ford. Willys-Overland has definite hopes of getting into passenger car production but this situation is clouded by the materials shortage.

Challenge Chrysler — DeSoto will have a new engine sometime during 1952. There seems to be little likelihood that the new engine will be available in quantity at the time of new model announcements. The new Dodge engine appears to be on the shelf for the present.

Cadillac is expected to announce a new engine that will directly challenge the new Chrysler V-8. Similarly, Lincoln has a new overhead valve V-8 engine.

New Nash Body—Power braking will be introduced on several 1952 models. (Last week on the Automotive News page, power braking was reported as being able to stop a car traveling at 60 mph in 5 ft. Of course, this would smear all car occupants against the windshield. Correct braking distance should have read 5 ft less than current braking systems.) The report is that Cadillac, Buick and Oldsmobile may offer power steering.

Extensive body changes will be made by both Lincoln and Ford. Nash will also have a new body. Nash is the only independent making major revisions.

Buying Impact — Chrysler statisticians have been at work computing the buying impact of their employees and other firms dependent on Chrysler for the volume of Detroit business. In the Detroit area, Chrysler estimates it employs from 90,000 to 100,000 people.

It buys from approximately 3000 Detroit firms employing another 40,000 people. The company sells vehicles to 75 dealers who themselves employ 3000 people. The total adds up to 143,000 people.

In Detroit, according to Chrysler figures, the average employee supports 2.7 persons. This means about 380,000 men, women and children depend directly on Chrysler Corp. for their livelihood. Chrysler estimates its employees and persons directly connected with the company account for 18 to 20 pct of the total retail buying in the Detroit area.

ROCKETS: Off the assembly line at left come Oldsmobile high compression "Rocket" engines at the Kettering Engine Plant, Lansing, Mich. At right are 3.5-in. rockets for the Army's super-bazooka on the way to the infra-red drying oven after painting.

NEW PLANTS: For Peace or War

Dual-purpose plants urged by GM chief . . Integrate civilian, military output . . . Combined production must be maintained . . . Can transfer personnel to other jobs.

Dual-purpose plants adaptable to either civilian or defense production, or a combination of both, as a permanent national defense policy were proposed by C. E. Wilson, GM president, at a meeting of the American Ordnance Assn. in Cincinnati last week.

Wilson stressed that, if we are to have an adequate and flexible mobilization plan for an indefinite period, we must develop ways and means of integrating military and civilian production.

Divided — The plants he envisioned would be in three parts: first, the main area, containing those facilities common to all types of manufacturing; second, an area in which would be located the equipment suitable only for civilian production, and third, those facilities limited to purely military equipment.

Such plants could also be used for simultaneous production of both military and civilian items. A large portion of the manufacturing space would readily be available for either purpose.

Quick Change—Necessary light equipment and fixtures for either or both types of production could be quickly moved in or out of such areas. Likewise, personnel would be immediately available and could be quickly transferred from one type of work to the other.

Auto Engineers Meet

Members of the Detroit Section, Society of Automotive Engineers, visited the Dearborn Engineering Laboratories and Test Track of the Ford Motor Co. last week to inaugurate SAE's 1951-52 program.

Members toured the test track in buses. The new Research Laboratories are now nearing completion, with dynamometer rooms in one wing of the research building already completed.

Harold Youngren, vice-president-engineering—of Ford, was host to the SAE members. The principal address was made by Benson Ford, vice-president of Ford Motor Co.

Preview — In his address Mr. Ford jet-propelled himself far into the future. Main topics of his talk were plastics, glass, synthetics, aluminum and the fuel problem. Atomic power, diesel engines and jet propulsion were also featured. In the field of highway safety he discussed briefly electronic controls to prevent collisions, the possibilities of using warning flashing lights for drivers and devices that will automatically dim an approaching car's headlights, eliminating hazardous glare.

Pontiac Builds Bofors Guns

Bofors gun barrels are now being put into production in limited quantities at G.M.'s Pontiac Div. The twin-mount guns Pontiac is building require eight spare barrels. More than 1500 machines will be needed for the job. Of this number, Pontiac has received approximately 600. The new building to house Bofors production is approximately 60 pct completed.

Pontiac will need 200 machine tools for production of its amphibious cargo carrier, the "Otter." Approximately 150 machines are now on hand. The rest must be purchased.

THE BULL OF THE WOODS — By J. R. Williams

Warehouses Want Bigger Steel Share

Jobbers complain base period was slump time . . . Want more than 100 pct allotment . . . Serve many small fabricators in area . . . Materials inventories remain high—*By R. T. Reinhardt.*

West Coast warehousemen, who sell a greater proportion of the steel used in their territories than do jobbers in other parts of the country, were not overly elated about last week's NPA order allocating them 100 pct of their base period purchases.

Not that this potential increase in inventories isn't appreciated, but they still believe the West is entitled to some special consideration because of the slump their business was in during the first 9 months of 1950. During that period western jobbers were trying to reduce inventories. It was only after June of that year business picked up.

It is contended that this base period may be representative for the East and Mid-west, but not for the West.

Serve Small Business—Indicative of the importance of warehouses to the metalworking industry in the West is the fact that in California alone there are more than 200—more than in any other state. These jobbers are serving the hundreds of small fabricators which by no stretch of economics could become mill buyers. These fabricators are employing from one to 25 men and their metal needs are relatively small—but important to the overall economy.

On this basis jobbers out here will continue to request a special base period for future allocations and are more than willing to submit inventory and sales figures to substantiate their claims.

To help maintain steel production, warehouse salesmen in the Pacific Northwest are scouting for scrap.

Inventories Holding—Raw materials—not specifically metals—have been accumulated by California manufacturers faster than finished products have been moving. At least this is the conclusion drawn from a survey made by California Manufacturers Assn. last month. Eighty-one pct of the membership reported their total inventory equal to or in excess of the total a year ago.

Fifty-nine pct stated their inventory was "up," and three-fourths of the manufacturers admitted their inventories had not been reduced during the last 3 months.

Checks Needed—This association is a good cross section of western industry and does not represent metalworking alone. However, metalworking is included and the situation points up the need for careful inventory checks to assure equitable distribution of available warehouse steel.

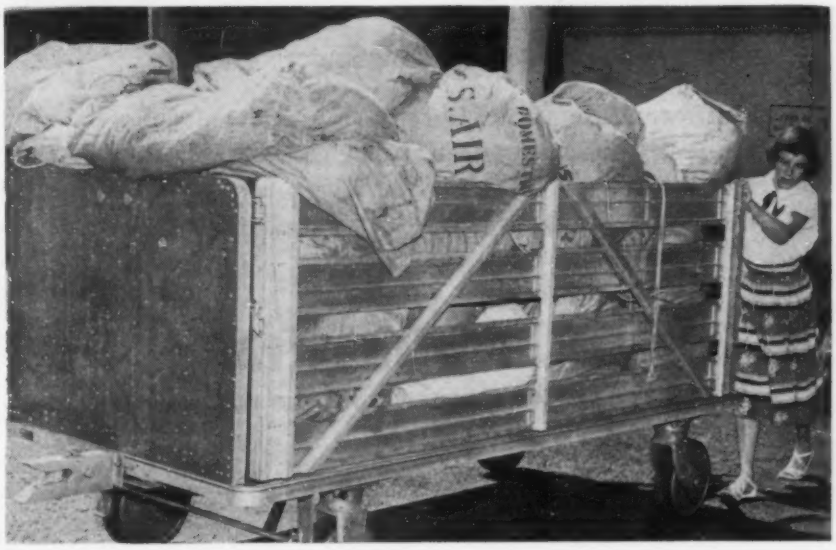
What's Important?—After the Washington office of NPA got through with its authorization of construction projects in the southwest region including California, Arizona, Nevada and Hawaii, 51 pct of the requests for steel expansion were left high and dry.

Also cut down were projects for 82 pct of the ferro-alloy industry, 26 pct for other industries and 11 pct for commercial construction.

Included among the approved projects were: UHF Television station, Mt. Wilson, Calif., $24,879; warehouse, Los Angeles, $397,000; addition to radio and television studio, American Broadcasting Co., San Francisco, $600,000; and a series of office buildings, department stores and medical building.

Meanwhile, steel production expansion in Los Angeles and Pittsburg, Calif., is not being held up because of steel shortages as yet; highway and bridge construction is stymied in Washington, Utah, and California.

LIGHTWEIGHT: Tobey Manufacturing Corp.'s all-aluminum Flexi-Truck, Model 130, has been adopted as standard equipment by Western Airlines. Weighing only 450 lb empty, the truck can be towed over the roughest terrain at 30 mph. A full load can be easily pushed by one person.



If your plant uses machine tools with tableways

YOU CAN'T AFFORD NOT TO READ THESE STATEMENTS

188 metalworking concerns which buy all their other lubricants from our competitors insist on the use of Sunoco Way Lubricant. *They* tell *us* no other refiner has a comparable product.

38 leading machine tool manufacturers approve or specifically recommend the use of Sunoco Way Lubricant on the tableways and slides of their metalworking equipment.

5 different metalworking problems have frequently disappeared as if by magic when Sunoco Way Lubricant was applied. Most such problems, while attributed to other causes, were proved to be the result of the use of inadequate tableway lubricants. Sunoco Way Lubricant has eliminated trouble supposedly caused by *poor machine tool design* and *deficiencies in hydraulic drives*. Sunoco Way Lubricant also has cleared up *inability to hold close tolerances* and has put an end to *poor finishes* and *scoring of ways*.

Want to see factual case histories and learn more about this product? Send for illustrated booklet, "Sunoco Way Lubricant." Samples are available, too, to companies in the metalworking industry. Write Dept. IA-10.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

Foreign Competitors Mass Strength

U. S. toolmakers uneasy as machine imports rise . . . Shorter delivery is selling factor but competition in normal market may be keen . . . We told you so on Bullards—*By George Elwers.*

Machine tool builders are beginning to worry a little about competition from foreign, mainly European, machine tools. Inroads are being made into both U. S. and foreign markets by the rapidly strengthening European machine tool builders.

Under present distorted market conditions, this makes little difference. But the U. S. machine tool industry knows all too well that a severe buyers' market will come again. Then European competition may be serious.

More Tool Imports—Within recent months an upsurge of U. S. industry buying machine tools in Europe had been reported. Aircraft makers, particularly, are reported to be buying in quantity. Curtiss-Wright purchases so far, for example, are reported to total over 1200 machines. Pratt & Whitney Aircraft is also reported to be a heavy buyer.

Thus present emergency buying introduces U. S. users to European machines, which will make things easier for salesmen of these machines later. Right now, European prices are not drastically below those of similar U. S. machines. But shorter delivery time is a strong selling factor in the U. S. today.

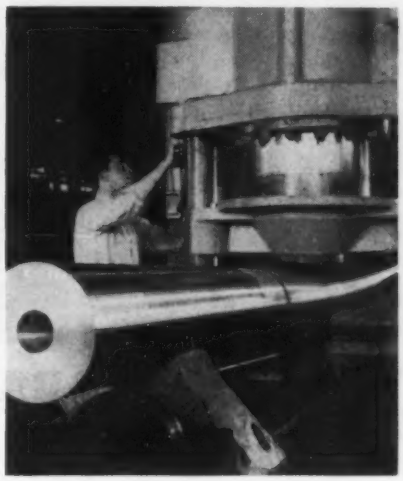
Of course, this delivery time will go up as orders from European machines increase. Also, there is some doubt as to whether the optimistic delivery dates being promised can be met by some foreign makers.

Real Threat—Until recent months, there was a tendency in the U. S. to pooh-pooh most European machine tools as of inferior quality—too light, inaccurate, and too simple. But recent reports from visitors to trade fairs and European builders' plants have held a different tone.

Many German, French, Italian, and other machine tools are good tools—designed and built well, they say. They can compete with U. S. machine tools, especially since low labor costs will enable underselling of U. S. machines in the future market.

Helping Competitors — It is ironic to note that most modern European machine plants have been built with ECA assistance, and contain many U. S.-built machine tools. U. S. production know-how is also being exported.

Still, machine tool builders in this country are confident of their ability to keep ahead of Europeans in the normal U. S. market. Our designs will always be a little more advanced, they say, and our sales engineering and repair service will always be much better. It is in the European markets in which U. S. builders will be in an unfavorable position.



CANNON BENDER: This 400-ton hydraulic press at Firestone Tire & Rubber Co.'s Akron plant puts a ½-in. bow in a 90-mm tank gun tube. Fifty thousand lb of pressure are used to remove a slight bend acquired in machining. When released, the tube is within the 0.002-in. Army tolerance.

Profit or Loss—Foreign sales normally take up about 25 pct of U. S. machine tool production. Often, like in the movie industry, foreign sales make the difference between profit and loss.

The dollar shortage abroad, coupled with lower prices and currently shorter deliveries, spell real post-mobilization trouble for this country's makers of standard machine tools. The U. S. holds undisputed pre-eminence in special tools. We're selling them to Europe now even as we buy, from Europe, standard tools.

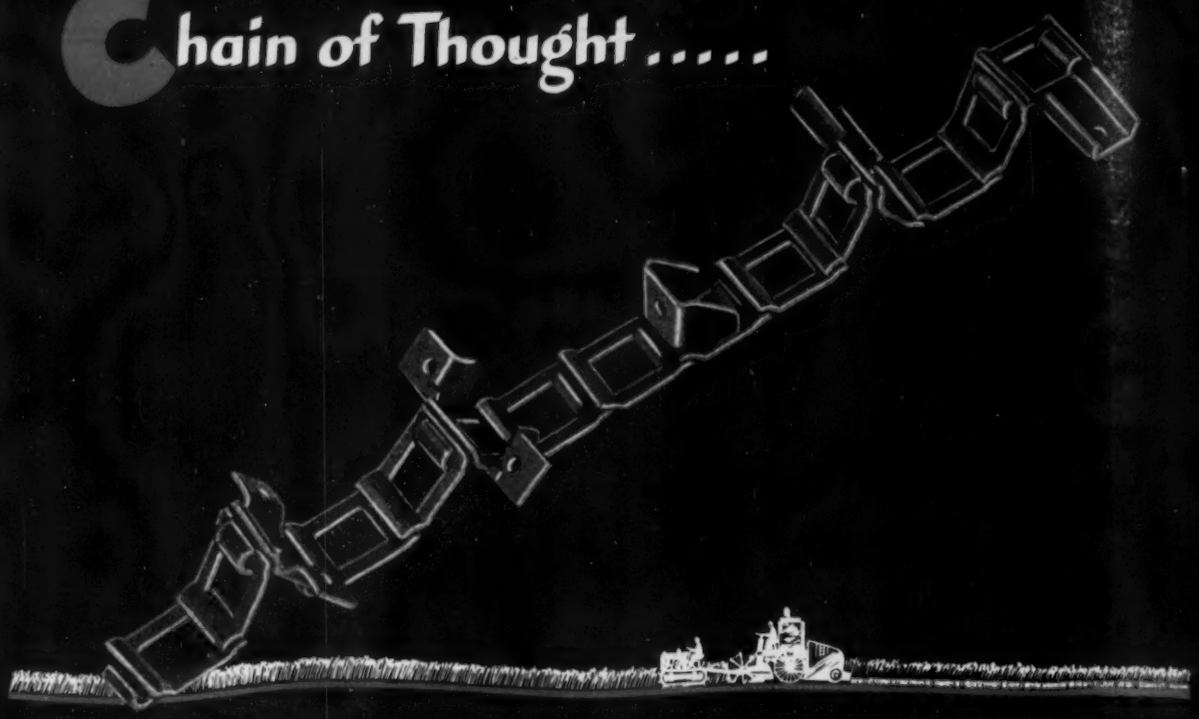
We Were Right — Much has been written explaining why the deal for Fisher Body to build Bullard vertical turret lathes would never go through. This column thoroughly reported all these arguments, but continued to predict that Washington pressure would push the deal to completion.

Now the two firms have announced that Fisher Body will go into production (THE IRON AGE, Oct. 4, p. 181). Plans call for maximum output of 50 units a month, with first deliveries scheduled for second quarter 1952.

Air Force Demand — Machine tool builders who fear their part of defense production will begin to taper off can take heart. Sights have been raised to an Air Force consisting of 140 groups.

Lt. Gen. O. R. Cook, the Air Force's top procurement man, told a meeting of the National Machine Tool Distributors' Assn. that producing a 95-group sky force requires about 75,000 machine tools for actual production and 10,000 more for maintenance and repair.

Chain of Thought.....



SHARON* SPECIAL ALLOY ADDS STRENGTH TO FARM IMPLEMENT CHAINS

The chain used on farm implements today is tougher, more rust resistant, easier working and less expensive than ever before. This is a direct result of cooperation between chain makers and the steel industry.

While manufacturers were developing a drive chain that could be produced directly from coils by automatic machinery, mill engineers were working out a stronger, more rust resistant steel that would be applicable to the automatic equipment.

The present farm program has expanded mechanization, demanding greater tonnages of this special chain steel, of which Sharon is one of the leading producers.

***Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.**

SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Indianapolis 6

SHARONSTEEL

The Iron Age

SALUTES

Alois Stauber

Tough jobs are old stuff for this man . . . Years of doing have made the unusual commonplace with him.

BACK in 1927 the papers were full of stories about Lucky Lindbergh, Clarence Chamberlain, Wiley Post and their daredevil transatlantic flights. Alois Stauber wasn't in the news, but he was in the act. He designed, built and installed fuel pumps in those history-making planes.

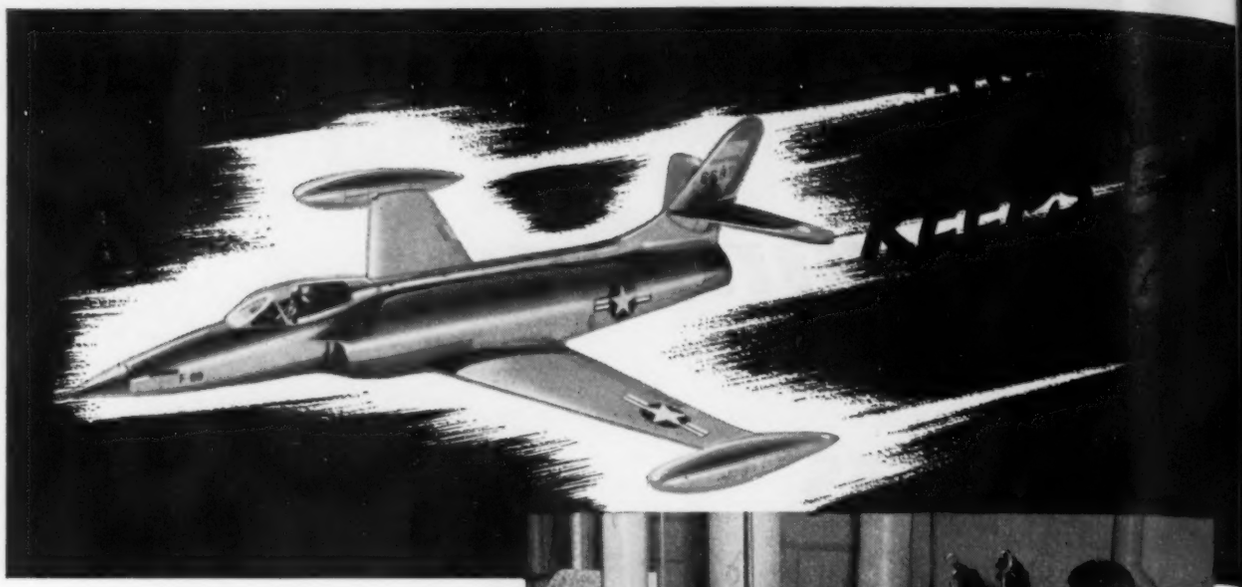
Even then Al had a reputation for taking an idea and turning it into a complex finished product in the shortest possible time—handling all intermediate design and tool work. The head of Daco Machine & Tool Co. still has that reputation.

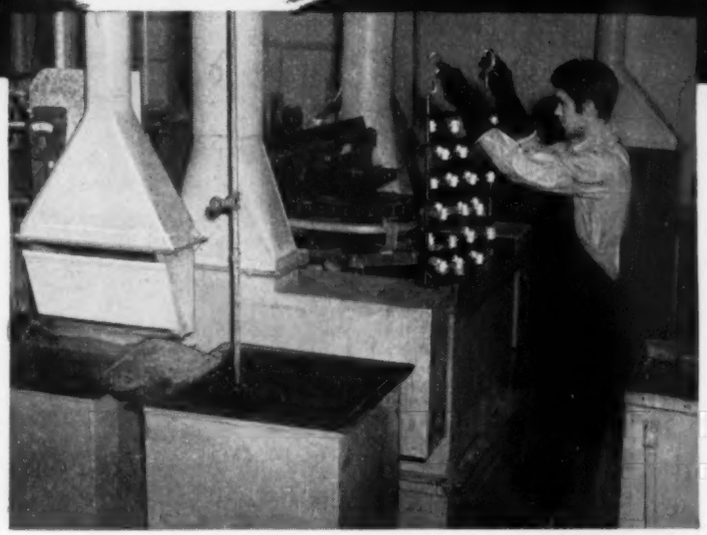
Right now he's engaged in a blueprint-to-finished-product job for Naval Ordnance—a super-precise electronically controlled gunsight.

Talking with Al you wouldn't get the idea he thinks he's doing anything unusual. Years of doing have made the unusual commonplace to him. Ideas, experienced men and liberal investment in modern, precision machinery are his formula.

Job after job proved the Stauber mousetrap theory. Daco men under Al developed a radical tube-forming technique that made history in the drawn-metal pipe-fitting field. They were able to move in quickly on tough jobs, often producing precise parts when dies weren't available.

Al was born in Germany 45 years ago, and learned his trade there—learned it well and hasn't forgotten. Even today he likes to be in the act. Kibitzing his machinists is his hobby as well as his work. He also likes baseball—providing you're talking about the Yankees.





SCINTILLA MAGNETO DIVISION OF BENDIX AVIATION CORPORATION USES UDYLITE EQUIPMENT AND PROCESSES TO SAFEGUARD VITAL AIRCRAFT IGNITION PARTS

Udylite plating installation at Scintilla Magneto Division of Bendix Aviation Corporation showing ignition connectors of the Lockheed F-90 Fighter being processed.

Spark of life to military aircraft—both jet and propeller driven—is the electrical system. Failure can be fatal, so the Scintilla Magneto Division gives the metal of ignition connectors a protective coating against rust and corrosion with Udylite plating equipment and processes.

Here you have an example of how Udylite is helping beat the ploughshares of peace into the swords of war. In defense weapons, ranging from side arms to submarines, you'll find that Udylite precision-plating is making an important contribution to national defense.

If you have a defense job that involves metal finishing, your Udylite Technical Man can lend you the experience gained in World War II when Udylite developed new machines and methods for bettering the plating of the tools of war. Call him today and state your problems. Or write direct to *The Udylite Corporation, Detroit 11, Michigan.* There's no obligation.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

The Iron Age

INTRODUCES

Walter V. McAdoo and **Walton B. Sommer**, elected directors for three years and **Paul W. Sommer** was elected a director for one year for KEYSTONE STEEL & WIRE CO., Peoria, Ill.

Jay S. Hudson, appointed assistant to executive vice-president of WILLARD STORAGE BATTERY CO., Cleveland.

H. V. Rasmussen, appointed executive engineer at the Wellsville, N. Y., plant of WORTHINGTON PUMP & MACHINERY CORP.

Don Young, appointed service manager for Aeroproducts Div., GENERAL MOTORS CORP., Dayton, Ohio.

John F. Ansink, elected as vice-president of the ROUND CHAIN & MFG. CO., Chicago.

F. I. Goodrich, promoted as general manager, Spring Div., EATON MFG. CO., Cleveland. **E. H. Lindeman** becomes assistant general manager, Leaf Springs and **H. H. Clark** becomes assistant general manager in charge of Coil Springs.

Milton W. Brooks, named sales manager of the newly formed Industrial Sales Div. of WHITE MOTOR CO., Cleveland.

Norman E. Craig, elected to the board of directors of HICKMAN, WILLIAMS & CO., Chicago.

Palmer M. Craig, appointed vice-president-engineering of the Television and Radio Div., PHILCO CORP., Philadelphia.

Robert S. Strawsburg, appointed district manager, Buffalo office of WARNER & SWASEY CO.

M. W. Barlow, joined FOUNDRY SERVICES LTD., Birmingham, England, as manager of their newly established Ferro Alloy Div. Mr. Barlow resigned from his position as sales manager of British Electro Metallurgical Co., Ltd.

Edward J. Roesch, appointed superintendent of the Meadow Lands, Pa., plant of the Brake Shoe & Castings Div., AMERICAN BRAKE SHOE CO. **Thomas P. Wallace** was appointed superintendent of the Division's Buffalo plant.

James H. Ingersoll, elected vice-president of the Ingersoll Products Div., BORG-WARNER CORP., Chicago.

John F. Spaulding, appointed sales manager of the BLACK & DECKER MFG. CO., Towson, Md.

Robert F. Morton, appointed to the staff of technical sales for APEX ALKALI PRODUCTS CO., Philadelphia.

Thomas E. Moffitt, named works manager of the Tacoma, Wash., plant for HOOKER ELECTROCHEMICAL CO. replacing **John D. Rue** who has retired. Other promotions: **George Gentes**, plant engineer; succeeding **Howard D. Norris**, retired; **Edwin A. Adams**, purchasing agent; **Chester D. Roberts**, traffic manager succeeding **Carl A. Steward**, retired.

A. L. Lentz, appointed sales manager of the WILLIAM K. STAMETS CO., Pittsburgh.

William H. Coatney, Jr., appointed section supervisor, engine manufacturing department of the Lincoln-Mercury Div., FORD MOTOR CO., Detroit.

Turn Page

KENNETH H. GAYLE, JR., former vice-president in charge of sales of The Ingalls Iron Works Co., Birmingham, elected president.

JAMES A. CROOKS, recently appointed manager of Commercial Research, Bethlehem Pacific Coast Steel Corp., San Francisco.

CARL A. TEN HOOPEN, SR., appointed Pacific Coast manager of sales, Cyclone Fence Div., American Steel & Wire Co.

Personnel

Continued

Robert M. Lloyd, elected vice-president—Raw Materials of U. S. STEEL CO., Pittsburgh.

Walter C. Cram, appointed regional manager, Detroit, Rochester, Cleveland, Cincinnati, Indianapolis and Pittsburgh, for CHASE BRASS & COPPER CO. **Willard M. Brown** was appointed manager of the Washington office. **John M. Gehl, Jr.,** was appointed regional manager for Dallas, Houston and Atlanta.

Donald L. Colwell, appointed chairman of non-ferrous group #7 and **Howard R. Youngkrantz** as one of the American conferees to the World Metallurgical Congress for the APEX SMELTING CO.

Williard H. Allen, elected to the board of directors of the THERMOID CO., Trenton, N. J.

E. J. Campbell, appointed Mid-Western district sales manager, Wolverine Tube Div., CALUMET & HECLA CONSOLIDATED COPPER CO.

Claude N. Monson, named manager of the AIRESEARCH MFG. CO., Los Angeles, a division of the Garrett Corp.

Edward R. Risbeck, named assistant plant comptroller at the Etna plant of the Spang-Chalfant Div., NATIONAL SUPPLY CO., Pittsburgh, succeeding **Theodore R. Fox,** who is being transferred to the Engine Div., Springfield, Ohio.

David J. Gemmell, named assistant to the president of Hodell Chain Co., a division of NATIONAL SCREW & MFG. CO., Cleveland.

Arthur E. Uber, Jr., appointed assistant to the manager, special products development division, WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Walter H. Shealor, became field engineer with the TIMKEN ROLLER BEARING CO., Washington.

Ludwig L. Motulsky, named product test engineer with INTERNATIONAL HARVESTER CO., Ft. Wayne, Ind., in the Motor Truck Div.

Elmer E. Hightower, named to the Detroit sales staff of the LAPEER MFG. CO.

ORVILLE F. FIGLEY, named assistant to the vice-president in charge of sales of U. S. Steel Supply Co., Chicago.

WESLEY N. GORDON, recently appointed Pittsburgh district manager of U. S. Steel Supply Co.

HARRY E. HASELTINE, elected Detroit vice-president in charge of marketing of all Copco Steel & Engineering Co. building products.

JOHAN A. MULLER, heads the newly formed development department at Lewis Welding & Engineering Corp., Bedford, Ohio.

—Personnel—

Continued

Leo F. Weston, Jr., elected president of the MIDWAY TOOL CO., INC., Melvin, Ohio.

R. M. Casper, appointed manager of the power department, ALLIS-CHALMERS MFG. CO., Milwaukee. **Tom W. Metz** has been appointed manager of the Indianapolis district, general machinery division. **Robert F. Loos** was made manager of the Evansville district.

Leo L. Hunter, named sales engineer, Manufacturers Sales Div., PERFECT CIRCLE CORP., Hagerstown, Ind.

E. J. Cloutier, Jr., joined TINNERMAN PRODUCTS, INC., Cleveland, in the capacity of district manager of the Pacific Coast sales office.

Joseph E. Muccioli, appointed staff quality control technical assistant with FORD MOTOR CO., Dearborn, Mich.

OBITUARIES

C. S. Blackburn, 59, sales manager for the Buckeye Foundry Co., Cincinnati.

Wright Wheelock, 82, retired sales manager of the St. Louis office of Carnegie-Illinois Steel Corp.

William F. McCarthy, former president of the American Machine Tool Distributors' Assn., Philadelphia.

George Grice Sherwood, 60, financial head of all Henry J. Kaiser's industries, recently at Oakland, Calif.

George Ramsey, 53, most recently affiliated with Lone Star Steel, Daingerfield, Tex., at Pasadena, Calif., recently.

Fred C. Hillman, plant manager of the Detroit Chevrolet forge plant, General Motors Corp. Mr. Hillman had been in the automotive industry in Detroit since 1916.

Calvin Sterling, 49, associated with International Nickel Co., Inc., since 1925, at Plainfield, N. J. Mr. Sterling was head of the analytical section of the company's research laboratory.

Edward J. Mershon, an associate of Pittsburgh-Des Moines Steel Co. Mr. Mershon was a nationally known figure in steel platework design and sales.

The Iron Age
FOUNDED 1855
Technical Articles

DIRECT READING SPECTROSCOPY speeds aluminum production

By J. R. Churchill
Chief, Analytical Division
Aluminum Research Laboratories
Aluminum Company of America
New Kensington, Pa.

High speed analysis of aluminum alloys on direct-reading quantometers has cut waiting time of Alcoa's holding hearths to a minimum. Of 7 million determinations made each year, 60 pct are already being made by this method. By the end of 1951 this percentage will be increased to 80 pct. Complete report may be obtained in 4 min or less.

Direct-reading spectroscopy for metallurgical analysis is now being made by Aluminum Co. of America in 65 pct of its 7 million yearly determinations on metal samples. In the past 5 yr 13 direct-reading instruments have been installed in its plants at a cost of more than $1 million. Four more will be added soon. It is estimated the firm will do 80 pct of its metal analyses on direct-readers by the end of 1951.

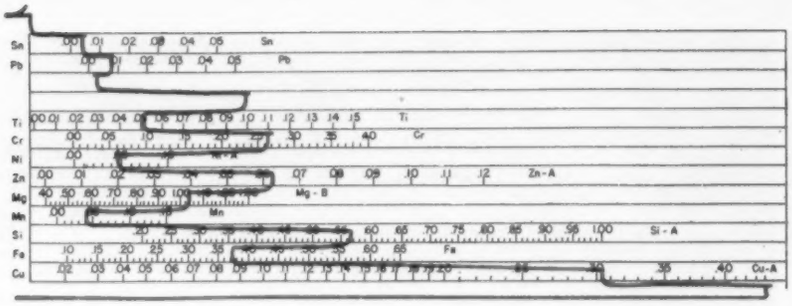
Thus, Alcoa nears a goal of many years' research: Provision of analytical data throughout the production process with such speed that metal is never expensively held up awaiting analysis reports. This has been brought about through use of quantometers and other automatic analytical instruments which can determine all the elements of interest in the hundred or more different alloys produced at Alcoa's plants.

From the moment a sample disc of aluminum is placed in a quantometer's sparking stand, less than a minute elapses before an analysis report is speeding back to the melting room or production line via teletype or pneumatic tube.

This procedure replaces historical analysis, which reveals the composition of an alloy after each stage of production, with control analysis, which reveals the composition concurrently with each stage.

Alcoa's development of control analysis goes back to the 1920's, when the company became interested in photographic spectroscopy as a possible replacement for, or supplement to, analytical chemistry. Methods for handling the various alloys of aluminum and magnesium were developed, and by 1943, 80 pct of all metal analysis was being done spectrographically.

Despite spectrography's advantage in speed over chemical methods, it still did not produce an analysis rapidly enough to make it economically worthwhile to hold the melt in the furnace. Some



ORIGINAL ANALYSIS of aluminum alloy sample as produced on the Production Control Quantometer in Alcoa's laboratories. Analysis requires about 1 min to complete.

Direct reading spectroscopy (continued)

of the most important elements from a control point of view could not be determined with sufficient precision. While spectrography was a step in the right direction, it did not replace the old system of historical analysis.

The main drawback of spectrographic analysis, both as to speed and precision, was the drawn-out process of film development and interpretation. Considerable thought and effort were devoted to replacing the photographic process with some type of light-measuring device. At that time vacuum tubes capable of transferring radiant energy to electrical energy lacked sensitivity.

In 1942 the electron multiplier phototube, developed for military use, became available commercially. Although the tube had the necessary sensitivity, it had not been designed to meet the purpose for which it was now intended. Hence, athough direct reading spectroscopic devices appeared feasible, there was still doubt as to their final success.

Broad research program

Alcoa undertook a broad program of research on electronic direct-reading instruments.

Because of war limits on materials, the first trial model of the quantometer was made largely from parts available in the shops of Applied Research Laboratories. After assembly and testing, it was shipped from the Glendale, Calif., plant of Applied Research to Alcoa's Aluminum Research Laboratories at New Kensington, Pa. The soundness of the instrument's fundamental design was substantiated. A second experimental model served to crystallize design and engineering. In 1946 the first quantometer, as known today, went into service at Aluminum Research Laboratories.

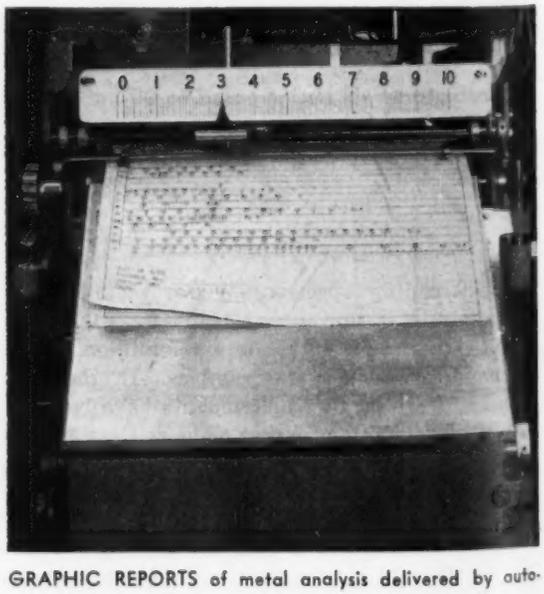
One of the most spectacular applications was made at a sheet mill in Alcoa, Tenn. The instrument handles 400 samples during an 8-hr shift. A pneumatic-tube carries samples taken from molten metal in holding hearths a quarter of a mile to the laboratory. Four-minute service is guaranteed on all samples. Since the quantometer serves a large number of furnaces, analysis must be made in less than a minute.

The first four instruments, were 12 receiver units capable of determining 11 elements. One receiver measured the intensity of an aluminum wave length as a control on the exposure.

To meet the needs of one reduction-fabrication plant, an instrument of greater scope was provided. It was fundamentally the same as previous models except for the addition of eight extra receivers and elimination of the instrument cases. Instead of building the equipment as a group of self-contained units, the components were assembled in the laboratory and rooms were built around the instrument.

This instrument provides analytical service to two reduction plants and two remelting rooms. Samples are sent to the laboratory through an elaborate pneumatic tube system over distances up to 7200 ft. Results are transmitted by teletype on all samples except those having only historical importance.

Five of Alcoa's 13 instruments are research model quantometers, seven are Applied Research Laboratories' Production Control Quantometers, and one is the Spectro-Analyzer, built by Fisher Scientific Co., of Pittsburgh.



GRAPHIC REPORTS of metal analysis delivered by automatic recorder can be read by untrained personnel.

The Production Control Quantometer produces a written analytical report. This report, in duplicate, saves time and eliminates errors in transcription. The duplicate form is kept in the laboratory while the original is sent to the melting room.

When the sample arrives in the laboratory, it is machined to a smooth surface and then sparked on that surface. During sparking the operator inserts the report form for that particular alloy into the instrument and writes in the date, sample number, and his own initials. At the end of the spark the instrument automatically steps through the recording sequence, designating on the report the percentage concentration of each element. At the end of the sequence the operator removes the report copies.

"Memory" stores data

An interesting innovation in the Production Control Quantometer is its electronic "memory." To facilitate standardization of the instrument, duplicate condensers for storing the signal from each spectrum line are provided. One can be used to store the signal resulting from sparking a standard of low concentration, the other to store the charge from a standard having a higher concentration. The amplifier and recorder can then be switched back and forth between the two condensers, and the zero and sentivity controls adjusted for the recorder to read the correct percentages of the two standards sparked.

A feature of the Production Control Quantometer is a novel monitoring system which notifies the operator when optical adjustment is required. This consists of three or four receiver channels similar to those used for analysis but registering deviation from optimum optical settings instead of concentrations.

The monitors are energized by aluminum lines whose intensities under optimum conditions are known. An ingenious optical-mechanical system automatically translates any maladjustment into a scale reading which tells the operator the adjustment required both as to direction and degree.

The Production Control Quantometer has no fixed upper limit on the number of elements and concentration ranges it can cover. On the instruments built so far it is possible to determine approximately 35 elements. In practice, however, the number of elements determined in one sample usually ranges from 8 to 12.

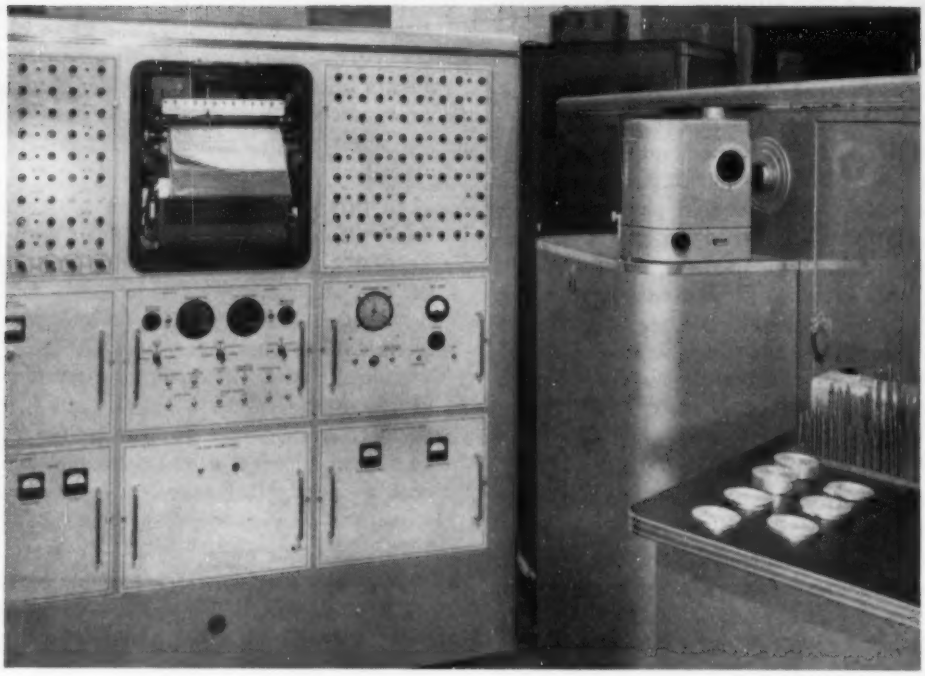
In this purely comparative system of analysis calibration of the instrument is a time-consuming necessity which directly influences effectiveness of the instrument. At present, calibration is accomplished by sparking standards of known chemical compositions. Because the precision of standardization should be greater than that of a single analytical test, and because there are so many channels and ranges to be calibrated, a faster, more precise method is needed. Also, the cost of analytical standards is an appreciable item.

Considerable experimental work has been done on the Production Control Quantometer in an effort to eliminate the use of standards as a calibrating medium. It has been found possible to calibrate the instrument by using a constant-intensity light source, with standards being used only once every 2 weeks to determine calibration values. Although now used only at Aluminum Research Laboratories, the new calibration lamp set-up is being readied for plant instruments of the future.

Other units developed

Alcoa has also been assisting other manufacturers in the development of direct-reading analytical instruments. The Fisher Spectro-Analyzer is a non-recording instrument capable of determining 14 elements with about the same speed and reliability as the research quantometer. An all-electronic excitation unit avoids some of the defects and maintenance problems characterizing conventional source units. The measuring system is built around a tuned ac amplifier,

OPERATOR PLACES aluminum alloy sample disc on electrode stand of quantometer in Alcoa's research laboratories.



QUANTOMETER CONSOLE with analysis coming from recorder. Cabinet with circular window contains electrode stand. At right are carbon electrodes and sample alloy discs. Shop gets full report in 4 min.

Direct reading spectroscopy (continued)

which picks out the signal to be measured and largely ignores the dark current, or "noise," characteristic of vacuum tubes of the electron-multiplier type. So far, the Spectro-Analyzer has been used in only one of Alcoa's aluminum fabricating plants. It is soon to be moved to an Alcoa magnesium foundry, where it will completely replace chemistry and photographic spectroscopy in metal analysis. While not on the market as yet, this instrument has a potentially wide application. It is well adapted to plants producing relatively few different types of alloys and requiring the highest speed of analysis.

The installation of a direct reader in a plant laboratory usually portends the virtual elimination of other means of metal analysis. Hence, when a plant is finally operating on direct-reader basis, it is entirely dependent upon the instrument. Breakdowns cannot be tolerated, and even maintenance has to be kept to a minimum. It is of interest to note that in 5 yr of operation the direct-reader which has produced the greatest number of analyses for Alcoa has had but three breakdowns of more than 1 hr's duration.

Use of direct-readers has led to many changes in production. In foundries certain alloys are made largely from scrap, with only one melting and with the final composition depending directly on rush analyses supplied by the quantometer. Before direct-readers were used, the scrap was melted and cast into ingots. Samples representing these ingots were run by "wet" chemical methods at considerable cost. When compositions were finally known, the ingots were remelted and blended to the alloy composition.

In the reduction plants molten metal from the reduction pots can now be transferred directly to holding hearths, where alloying constituents are added, the ingots poured, and the metal processed with minimum loss of btu's. Formerly metal was siphoned from the pots, poured into pigs, and the pigs graded by historical analysis. Later the pigs were remelted, alloying constituents added, and alloy ingots cast.

In many fabricating plants and foundries these alloy ingots formerly were stored until their analyses were completed. When an analysis became available, it was necessary to search out the ingot, call for the crane, and transport the ingot to the saw platform or scalper. With reliable analysis available almost instantly at each stage of production, many of these steps can be eliminated or shortened.

A major contribution of the direct-reader is the elimination of off-composition metal. Of probably greater potential importance, however, is the fact that melts can be held closer to optimum compositions, resulting in alloys with more nearly optimum properties. To the manufacturer, higher physical properties resulting from closer control of composition mean higher quality and lower cost of product. To the consumer it will mean a better product at lower cost.

Tool steel heat treaters can profit from T-T-T curves

by
L. H. Seabright
Metallurgical Engineer
Vulcan Stamping & Mfg. Co.
Bellwood, Ill.

Time-Temperature-Transformation curves reveal much valuable information on how to heat treat tool and die steels. They show how to minimize distortion of water-hardening and oil-hardening steels; and the most practical way to cool high speed steels to satisfactorily transform austenite.

Everyone concerned with heat treating tool steels should be familiar with the time-temperature-transformation curves of these steels. A study of T-T-T curves will show their value in understanding the practical applications and the principles underlying the heat treating operations for the various types of steels.

The steels discussed here are listed in Table I according to their Wear-Toughness[1] classification. Their analyses are given in Table II. The same group numbers used in these tables are used in the graphs and text of this article.

According to the general concept of hardening and quenching, it is necessary to avoid transformation of the austenite until it reaches a relatively low temperature. Here it begins to transform to the hard, martensitic structure. The minimum rate of cooling necessary to accomplish this is set by the minimum time required for beginning of transformation at the knee of the curve. If transformation is prevented in cooling through this range, the steel will harden even though cooled at a moderate speed once its temperature has dropped below the knee.

The upper portions of the T-T-T curves illustrate well-known facts: Water-hardening steels must be cooled very rapidly through the temperature range from about 1200° F to 800° F in order to prevent the austenite content from transforming to relatively soft high temperature products. Oil-hardening steels need not be cooled quite so rapidly, since the austenite of these steels transforms more slowly at high temperatures. Some of the higher alloy die steels and the high speed steels may be hardened without a rapid quench, since the austenite of these steels transforms so slowly.

The lower part of the curves show the Ms point for each of the steels. This is the point where austenite just begins to transform to martensite. The subsequent horizontal lines indicate the approximate amount of martensite which has

TABLE I

TOOL AND DIE STEELS

Primary Application	Water-Hardening	Oil-Hardening	High Speed and Hot Work
Maximum wear resistance	Group 1	Group 5	Group 9
General cutting tools	2	6	10
General die work	3	7	11
Maximum toughness	4	8	12

TABLE II

ANALYSES* OF TOOL AND DIE STEELS

Group No.	C Pct	Mn Pct	Si Pct	Cr Pct	W Pct	V Pct	Mo Pct	Co Pct	Ni Pct
1	1.25-1.50	0.15-0.50	0.15-0.75	0.0 - 1.80	0.0- 6.00	0.0 -0.35	0.0- 0.50	.....	.....
2	1.10-1.50	0.15-0.50	0.15-1.00	0.0 - 1.20	0.0- 2.50	0.0 -0.30	0.0- 0.30	(Al 0.00-0.25)	
3	0.90-1.10	0.15-0.35	0.15-0.50	0.0 - 1.50	0.0- 2.50	0.0 -0.50	.....	.....	.....
4	0.45-0.90	0.15-1.00	0.15-2.25	0.0 - 1.20	.....	0.0 -0.35	0.0- 0.60	.....	0.0-0.60
5	1.00-2.50	0.15-1.20	0.15-1.10	10.50-14.00	0.0- 2.00	0.0 -1.25	0.0- 1.50	0.0- 4.00	0.0-1.00
6	1.10-1.30	0.15-0.95	0.15-0.35	0.25- 1.75	0.0- 2.50	0.0 -0.40	0.0- 0.75	.....	.....
7	0.70-1.50	0.30-3.25	0.15-1.40	0.0 - 5.50	0.0- 1.10	0.0 -0.50	0.0- 1.75	.....	0.0-2.00
8	0.40-0.90	0.15-1.25	0.15-2.25	0.0 - 2.00	0.0- 3.00	0.0 -0.60	0.0- 2.20	.....	0.0-2.50
9	0.65-0.95	0.15-0.35	0.15-0.50	3.5 - 4.75	0.0-23.00	0.75-3.00	0.0-10.00	2.0-15.00	.....
10	0.55-1.55	0.15-0.35	0.15-0.75	3.5 - 4.75	0.0-21.00	0.50-5.25	0.0- 9.50	0.0- 5.25	.....
11	0.25-0.65	0.15-0.75	0.15-1.75	1.25- 7.50	0.0-19.00	0.0 -1.25	0.0- 9.00	0.0- 2.00	0.0-3.00
12	0.25-1.00	0.15-1.25	0.15-1.35	0.50- 7.50	0.0- 4.25	0.0 -1.15	0.0- 3.00	0.0- 0.60	0.0-5.00

* Ranges of the groups as classified in Table 1.

T-T-T curves (continued)

formed when the steel has cooled to these temperatures. The right ends of these indicate the times at which isothermal transformation will start if the austenite is held long enough at these temperatures. For example, for Type 3 steel, as shown in Fig. 1, the 350° F line ends at 20 min. This means that if the austenite of this steel is cooled to 350° F and held at this temperature, about 50 pct of the austenite will transform immediately to martensite. And the remaining 50 pct will begin to transform isothermally in about 20 min, and will continue to transform until about 4 hr elapse. At this time the austenite will be completely transformed, as indicated by the end of the transformation line.

At 300° F the line ends at 2 hr. At this temperature then the austenite which has not already transformed, begins to transform isothermally in about 2 hr and continues to transform as long as it is held at this temperature. The rate of transformation is quite slow at this temperature and according to the curve is only about 95 pct complete after 15 hr.

There has been some controversy over the actual amount of austenite remaining at these temperatures, especially for the higher alloy steels. But regardless of the amount of austenite actually present, the curves show clearly why steels should be cooled close to room temperature before they are tempered, especially for the oil-hardening steels.

The curves further illustrate that water-hardening steels are shallow-hardening because the transformation to martensite takes place so quickly in water-quenching and is completed before the inside of the steel has a chance to start transforming. This cooling rate necessary to transform steels from austenite to martensite varies from 9000° F per sec in very low carbon steel to less than 1° F per sec in some of the high alloy steels.

When the water-hardening steels are treated in large sections, a serious condition may arise, which frequently causes pieces to crack. In quenching, the hardened martensitic structure commences to form at a temperature of about 400° F accompanied by expansion. The hardening transformation is completed within the range of 100° to 200° F where the expansion ceases. Obviously, if the work is removed from the quench before the hardening transformation is completed, it will not have attained full hardness. In fact, cracking may occur if the work is re-

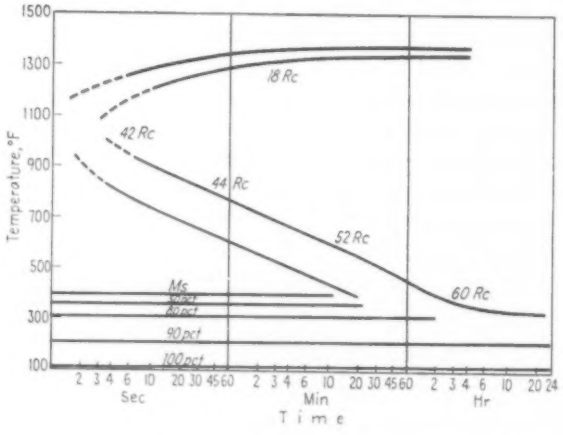


FIG. 1—Time-Temperature-Transformation curves for a carbon or carbon-vanadium die steel, Group 3. Austenitizing temperature: 1450°F. Prior condition: annealed. Analysis: C-1.00, Mn-0.20, Si-0.25, V-0.25.

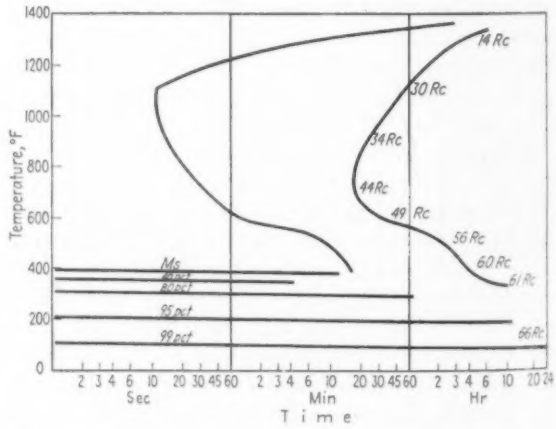


FIG. 2—Time-Temperature-Transformation curves for a manganese non-deforming or molybdenum-graphitic steel, Group 7. Austenitizing temperature: 1450°F. Prior condition: annealed. Analysis: C-0.90, Mn-1.25, Si-0.30, W-0.50, Cr-0.50. (All charts by Crucible Steel Co.)

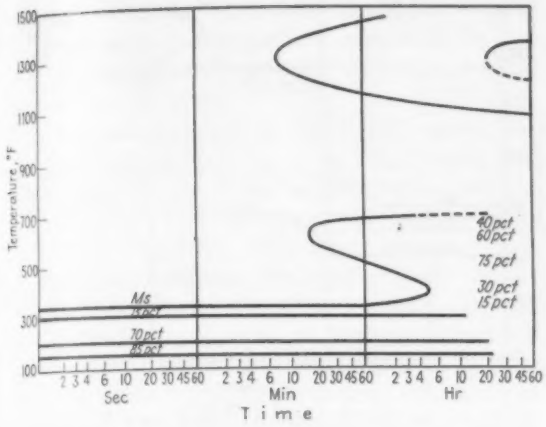


FIG. 3—Time-Temperature-Transformation curves for a chromium-molybdenum steel, Group 7. Austenitizing temperature: 1800°F. Prior condition: annealed. Analysis: C-1.00, Mn-0.40, Si-0.30, Cr-5.25, V-0.40, Mo-1.15.

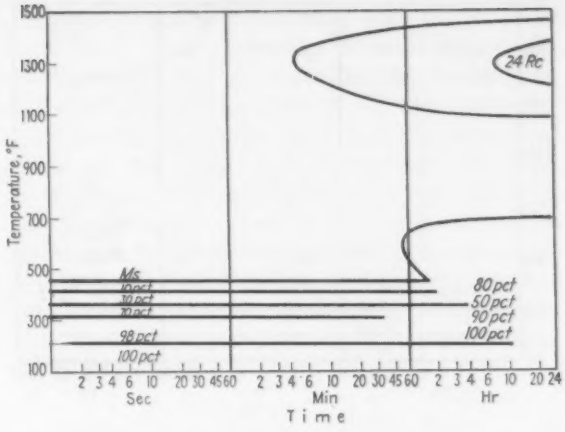


FIG. 4—Time-Temperature-Transformation curves for a high-carbon, high-chromium steel, Group 5. Austenitizing temperature: 1800°F. Prior condition: annealed. Analysis: C-1.50, Mn-0.25, Si-0.30, Cr-11.5, V-0.20, Mo-0.80.

moved within the limits of 200° to 400° F. It is therefore very important to allow the tool to cool down to about 170° F or so that it can be held in the hand without discomfort.

Cold quench cracks large blocks

In the event a large block is allowed to go cold completely in the quench it may crack, probably because the cold, hard metal on the outside of the block does not yield sufficiently to the stresses set up when the last portion of the austenite within the block transforms to martensite with an accompanying increase in volume. A double temper is usually desirable in such cases.

In the hardening of oil and air-hardening steels, the required quenching rate is much slower, than for water quenching. This results in lower temperature gradients between the center and the outside of the section. In addition the transformation rates are so sluggish in these steels that practically all of the austenite transforms at temperatures below the Ms point of the steel, usually below 400° F. The cooling rates from 400° F to room temperature are quite slow in warm quenching oil and in air. Therefore, large pieces may require considerable time before they are cooled to temperatures below 200° F. As shown in Fig. 2, 3, and 4, the oil-hardening nondeforming steel, the chrome-molybdenum steel, and the air-hardening high-carbon, high-chromium steel, are about 95 pct transformed by the time they cool to 200° F, but the 5 pct chromium air-hardening steel and the 5 high speed steels contain 20 pct or more of austenite at 200° F. Tools made from the first of these steels could be tempered satisfactorily as soon as they had cooled throughout to about 150° F, but tools made from the last group should theoretically be cooled throughout at least to 100° F before they are tempered. In the event the tools are tempered before the austenite is completly transformed, the supposedly tempered tool will contain some untempered martensite when it cools to room temperature. It will then be in such a brittle or highly strained condition that it may crack in service. This brittle condition may be relieved by a second tempering treatment.

With reference to distortion, Riedel[2] has shown inherent distortion factors which are commonly used in connection with the hardening of tool steel, ranging from 0.002 in. per in. for carbon tool steel to 0.0005 in. per in. for high-carbon, high-chromium steel.

In the study of distortion, certain factors should be considered: Steels expand when heated and contract when cooled, except when passing through the transformation range. Cold steel is hard, while hot steel is soft. Obviously, then, during liquid quenching operations where great temperature differentials occur, the cold steel will be rigid, while the hot steel will deform in response to stresses set up by the temperature differences. A further cause for distortion occurs during the transformation zone. Heated steel in the austenitic condition, occupies a smaller volume than the original steel. On the other hand, quenched steel in the martensitic condition occupies a greater volume than the original steel.

From considering these factors, the solution to the problem is obviously quenching the steel quickly down to a point just above the Ms point, then allowing the full section to cool to room temperature followed by tempering.

Quenching procedures defined

There are certain variations of this interrupted quenching procedure which are referred to as Austempering, Martempering and Marquenching. The definition here given for Marquenching is often used in the trade as a definition for Martempering. The definitions given here distinguish between the two. Austempering[3] consists of quenching from the austenitizing temperature into another medium which is usually an agitated salt bath held at the temperature range in which bainite is formed. The steel is held at this tem-

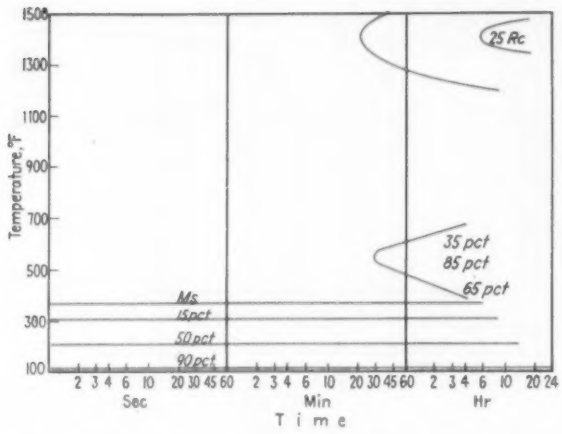


FIG. 5—Time-Temperature-Transformation curves for a molybdenum-tungsten high speed steel, Group 10. Austenitizing temp: 2200°F. Prior condition: annealed. Analysis: C-0.83, Mn-0.25, Si-0.3, W-6.4, Cr-4.15, V-1.9, Mo-5.0.

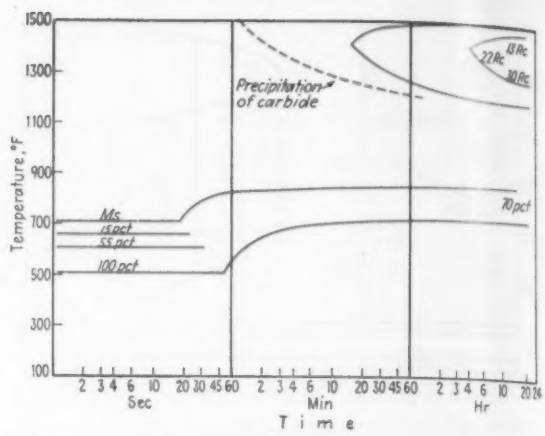


FIG. 6—Time-Temperature-Transformation curves for a high-tungsten hot work steel, Group 11. Austenitizing temperature: 2150°F. Critical temperature—Ac_1: 1490°F. Analysis: C-0.40, Mn-0.30, Si-0.30, W-11.50, Cr-2.00, V-0.35.

T-T-T curves (continued)

perature long enough to allow the austenite to transform to bainite isothermally. Martempering consists of quenching from the austenitizing temperature to the Ms temperature or very slightly below, and holding at this temperature until transformation from austenite is complete. The structure resulting from this is actually a combination of tempered and lower bainite which is considerably tougher than a similar specimen composed entirely of martensite. Marquenching is the term which is usually applied to interrupted quench only, without involving isothermal transformation. This is accomplished by quenching from the austenitizing temperature to the Ms temperature and holding just long enough to equalize the temperature through the quenched piece. The piece is then allowed to cool in air, after which the microstructure will be composed of martensite except for a small percentage of retained austenite and dissolved carbide.

Transformation is uniform

This type of quenching has many advantages and will contribute a lot towards lessening the deformation of the piece. This is because the transformation change from austenite to martensite will be starting at the same time throughout the entire section, which would be impossible in oil-quenching to room temperature. The interrupted quench also allows more opportunity for completion of the transformation and results in a lower percent of retained austenite in the quenched piece than there would be had it been oil-quenched.

The problem of quenching high-speed steel low enough to transform austenite has been mentioned. Even if the steel were quenched to room temperature a certain amount of untransformed austenite still remains, which may prove detrimental.

If high-speed steel is cooled in still air from the austenitizing temperature to room temperature, fairly high hardness may be expected in the as-cooled piece, since the high temperature transformation of austenite to softer products is very sluggish. Most of the austenite will transform below 700° F, forming either bainite or martensite, both of which have a high Rockwell hardness. However, when air-cooling thick sections, some precipitation of carbides will take place at temperatures about 1300° F. This depletion of the carbide content from the solid solution results in lower hardness after tempering, lower wear resistance, and lower hot hardness. It is therefore impractical to air-cool anything but fairly thin sections. Type 10 Mo-W high-speed steel has somewhat greater hardenability than others and may be air-hardened in sections up to 1 in. thick.

Quenching of the steel from the austenitizing temperature into a molten bath at about 1000° F has several advantages over the other methods: It cools the steel past the knee of the curve fast enough to prevent carbide precipitation. And it equalizes the temperature throughout the section in a temperature range where transformation to martensite does not occur. Cooling in air from the hot quench to room temperature allows the austenite to transform slowly and uniformly throughout the mass while the piece is cooling through the Ms point.

Not all austenite transformed

The curves for high-speed steel, Fig. 5, show that after cooling to room temperature there may be as high as 15 pct of the original austenite remaining untransformed. It is because of this retained austenite that a double tempering operation is recommended for high-speed steel. The first is to stress-relieve the original martensite and condition the retained austenite so that it will transform. The time for tempering will depend on the drawing temperature; the lower the drawing temperature the longer the time required

for the operation. The second tempering cycle is intended only to temper and stress-relieve the martensite formed on cooling from the preceeding tempering operation.

In the development of the T-T-T curves for the hot-work steels, Fig. 6 and 7, Payson and Nehrenberg[4] noted grain boundary precipitation if the steel was held for a short time around 1600° F before quenching. This grain boundary precipitation of carbides took place rapidly in the chromium steels at temperatures around 1500° F, and in the tungsten steels at temperatures from about 1500° to 1900° F. With further cooling, the formation of the ferrite-carbide aggregate at about 1300° to 1450° F was found to be quite slow in all the steels. The bainite reaction was fairly rapid in the chromium steels between 300 and 600° F, and in the tungsten steels between 600 and 800° F. The martensite reaction goes to completion at about 300° to 500° F in the tungsten steels, and at about room temperature in the chromium steels.

Martensite not homogeneous

From this it can be implied that although these steels are actually air-hardening, their structures in moderate sections when cooled in air from the austenitizing temperatures would not be homogeneous martensite, but would consist of martensite and bainite. In addition they would have carbides precipitated at the boundaries of the prior austenite grains. This is of practical significance since tools made from these steels are frequently of heavy section. Therefore, it would be necessary to determine the quenching practice from the size and requirements of the work to be treated.

Show how to avoid hardening

In the foregoing examples, reference has been made entirely to the hardening of steel. In certain cases however, it is equally important to know how to avoid hardening. In these cases the curve representing the ending of the transformation is the significant one, since it shows approximately how slowly the steel must be cooled to avoid formation of the hard martensitic structure, and at what temperature the retarded cooling may be safely discontinued. Thus in an annealing operation involving furnace cooling from the austenitic condition, the diagram from Type 3C, Fig. 1, indicates that in this case there is no object to continuing furnace cooling below 800° F. This is because during cooling to this temperature, all of the austenite will have already been transformed to the softer structures.

This temperature at which slow cooling may be discontinued varies with the type of steel in accordance with differences in the form of the T-T-T curves.

This analysis of T-T-T curves shows that: Water-hardening steels distort more in hardening because of the unavoidably high temperature gradients. This distortion is most serious in small sections and accounts for the desirability of quenching small sections in oil where possible.

Oil-hardening steels show less distortion because of the slower transformation rates and lower temperature gradients resulting from oil-quenching. This distortion may be even further minimized by quenching the steel to the Ms temperature or slightly below, and holding at this temperature until transformation is complete. This would be followed by air-cooling and subsequent tempering.

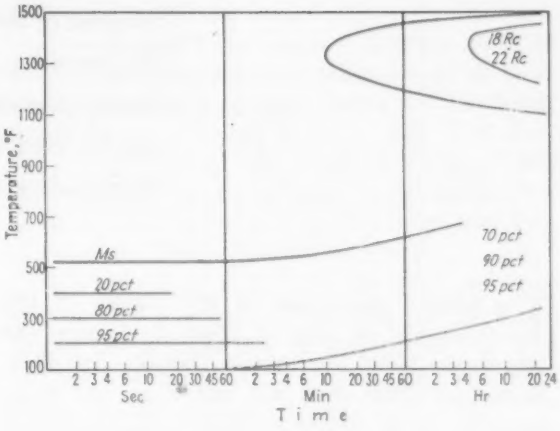


FIG. 7—Time-Temperature-Transformation curves for a chromium-molybdenum hot work steel. Austenitizing temperature: 1850°F. Prior condition: annealed. Analysis: C-0.40, Mn-0.35, Si-1.05, Cr-5.00, V-1.10, Mo-1.35.

Air-hardening steels exhibit an exceedingly sluggish rate of transformation. Thus with air-quenching, temperature gradients and distortion are held to a minimum.

From the T-T-T curves it would first appear necessary to cool most high-speed steels to room temperature or below in order to satisfactorily transform austenite. However since this is very impractical, quenching to about 1000° F is recommended, as this cools the steel past the knee of the T-T-T curve fast enough to prevent carbide precipitation and conditions the austenite for subsequent transformations.

References:

[1]Seabright, L. H., "The Selection and Hardening of Tool Steels," p. 2, McGraw-Hill, N. Y., 1950.

[2]Riedel, J. Y., "Distortion of Toolsteel in Heat Treatment," Metal Progress, April, 1950, p. 853-9.

[3]Boyer, H. E., "Controlling Physical Properties by the Interrupted Quench," Iron Age, July 3, 1947, p. 49-54.

[4]Payson, P. and Nehrenberg, A. E., "The Metallography and Properties of High Alloy Hot Work Steels," American Iron & Steel Institute, 1948.

AISE
Steel operators attend technical meeting

Forty technical papers and fourteen operating practice sessions were featured at the AISE Annual Convention in Chicago. The men who are executing the largest steel expansion program in history are having procurement troubles. Materials needed for building and regular production are slow coming in. Electrical equipment deliveries are extremely difficult.

The largest convention in the history of the Association of Iron & Steel Engineers was held at the Hotel Sherman in Chicago last week. More than 3000 steel mill operating and engineering executives from all parts of the United States and several foreign countries gathered together at the 4-day meeting to hear 40 technical papers presented at 14 sessions covering major fields of steel mill operations.

In the midst of renewing old friendships and discussing the various technical papers presented, operating men indulging in shop talk expressed serious concern over the many problems facing them in these times of industry expansion and growing defense restrictions and requirements.

Their major problem at the moment is the procurement of materials needed to complete expansion facilities now underway and to maintain those facilities now in operation. Cuts in steel allotments for industry expansion projects are pushing completion dates further into the future. Some companies with steel making equipment already finished are unable to procure enough steel to put them under roof and in operation.

Other producers are suffering from slow delivery of steel mill equipment which has been held up by shortages of various items such as steel castings, electric motors, etc. Deliveries of electric motors are running 6 months behind. Any kind of wire rope or cable is extremely dif-

TECHNICAL PAPERS were popular. Here, John C. Lebens, chief engineer, Great Lakes Steel Corp. delivers his paper "Increased Interrupting Capacity in Fuses," at one of the electrical sessions.

NEW AISE OFFICERS for 1952 are, left to right: I. N. Tull, president; J. L. Young, vice-president; F. L. Anderson, second vice-president and J. H. Vohr, treasurer. Mr. Tull is electrical superintendent of Republic Steel Corp., Cleveland. Mr. Young is chief engineer, U. S. Steel Co. Mr. Anderson is electrical superintendent, Bethlehem Steel Co., Johnstown, and Mr. Vohr is general superintendent, U. S. Steel Co., Gary Works, the world's largest steel plant.

ficult to get delivery on. Some companies making fuses are running 7 months behind on orders.

To keep all phases of an expansion project proceeding at the same rate is almost impossible. In general, electrical departments are running behind the mechanical, just the reverse of normal times. To further aggravate the situation there is a shortage of steel mill design engineers.

Aside from construction problems some quarters expressed concern over the raw materials supply once expansions come in and the transportation facilities to deliver them. With a good part of the expansion program scheduled for early spring completion, there is some discussion over whether there will be enough bottoms to float ore to the mills. While ore fleets are building many new boats, the bulk of them won't be completed for 18 more months. Others were worried about the construction of ore bridges being hampered by the lack of steel, iron workers and electricians. In spite of these difficulties, the operating men are confident that there are few problems they can't lick with the burning of a lot of midnight oil and good hard work.

Lorig wins top Kelly award

Prize winning AISE Kelly Ward papers for 1950 were chosen at a pre-convention meeting of the Board of Directors on Sept. 30. Top winner in the competition was E. T. Lorig, head of the senior staff engineering bureau, United States Steel Co., Pittsburgh, whose treatise, "Automatic Self-Centering Rolls and Pulleys," described methods by which operators can move material over roller conveyers without the need for guides, etc. Equipment described in the paper moves the material to the middle of a conveyer and keeps it moving there.

Second prize went to Carl G. Hogberg, blast furnace committee, United States Steel Corp. of Delaware, Pittsburgh, for his paper describing technical aspects of northern and southern blast furnace practice. "Five Years of Blast Furnace Operation Under Elevated Top Pressure" was the title of a paper which won the third prize awarded posthumously to Frank Janecek, formerly blast furnace engineer for Republic Steel Corp., Cleveland.

Runners-up in the contest included Ross E. Benyon, superintendent of the roll shop at U. S. Steel Co.'s South Chicago works for his paper "Pass Design Angular Sections" and W. C. Barret, Republic Steel Corp., for his paper "Rail Slitting Mill" and Andrew F. Kritscher, National Tube Co., for his paper "Design and Performance of Large Rotary Furnaces."

New officers of the association for 1952 were elected at a business session held on the morning of the opening day of the convention. The honor of president went to I. N. Tull, electrical superintendent of the Cleveland district for the Republic Steel Corp. Mr. Tull moves up from the first vice presidency from which position he has been acting president since the resignation of John F. Black.

New officers installed

The new AISE first vice-president will be John L. Young, vice-president-chief engineer, United States Steel Co. E. L. Anderson, electrical superintendent, Bethlehem Steel, was elected second vice-president. The position of treasurer went to John H. Vohr, general superintendent of U. S. Steel Co.'s Gary works, while W. H. Collison, coke plant superintendent of Great Lakes Steel Corp., was elected secretary.

Three honorary directors were also elected. They are James Farrington, electrical superintendent, Wheeling Steel Corp.; Charles L. McGranahan, technical assistant to works manager, Sollac, Hoyange, France; and L. F. Coffin, superintendent, mechanical department, Bethlehem Steel Corp., Sparrows Point, Md. James D. O'Roark, assistant to manager of service maintenance, Weirton Steel Co., was elected director-at-large.

Following the business meeting Monday morning, electrical and combustion sessions were held simultaneously during the remainder of the morning.

At the operating practice session held Monday afternoon a highly controversial subject of in-

terest to many members was discussed by H. W. McQuaid, consulting engineer, in his paper entitled "A Comparison of Electric and Openhearth Economics."

He claimed that mainly because of the increasing costs of investment and operation of open hearths and the improved design and operation of electric arc furnaces, with more stable power costs, the modern arc furnace in most instances can compete with the modern open hearth. Furthermore, in meeting smaller production requirements it has a definite advantage.

While the production of alloy and fully killed carbon steels show electric furnaces off to their greatest economic advantage, they can hold their own without too much trouble in semi-killed and rimmed carbon steel production as well when competing against the cold iron openhearth.

The scarcity and high cost of scrap are presently the greatest deterrent to electric furnace expansion. Until a lower charge material is found the installation of many new electric furnaces will be thought economically unwise. The solution to the problem will in all likelihood necessitate a cooperative development of the low temperature reduction of iron ore concentrate with hydrogen. It may be possible that the reduction of sintered iron ore concentrates by intimately mixed carbon in the arc furnace will prove economical under certain conditions.

The future of the electric furnace, Mr. McQuaid related, lies in its contribution to the decentralization of the steel industry. They hold promise of making possible the location of steel producing operations close to consumers who are presently relatively remote from large steelmaking centers. See "Small Steel Mills for Local Markets," THE IRON AGE, April 6, 1950, p. 90.

The second day of the convention was highlighted by a 2-hr tour through Gary sheet and tin mill of the United States Steel Co. Over 600 members went on the tour. Host to the group was C. A. Ferguson, general superintendent of the mill. Of outstanding interest were the plant's new pickling facilities and galvanizing and annealing lines. The continuous annealing line has an annual capacity of 136,000 tons. Tin and black plate products are continuously annealed in various thicknesses and widths ranging from 18 to 37 in. wide.

AT OPERATING PRACTICE session, H. F. Lesso, openhearth control metallurgist, Great Lakes Steel Corp., delivers his paper, "Production Characteristics of the Openhearth."

Earlier in the day members attending a rolling mill session heard a unique paper delivered by Frank F. Zipf, superintendent of roll department, Bethlehem Steel Co., on "Roll Turning with Tracer Controlled Lathe." In the article the author briefly described electric and hydraulic tracer controls and their advantages in roll turning. Information on the selection of proper grades of carbide tools which make possible the use of this type of machine in roll turning was also given.

Machining operation photographed

A photographic study showing the hourly machining progress of the turning of a pair of two-high rolls for a rail section turned on a tracer lathe was presented. The time saved by the method as compared with the use of a conventional type roll turning lathe was also shown.

At the same session, A. H. Griffiths, rolling mill superintendent, Sheffield Steel Corp., Kansas City, described the operation of a new type 12-in. continuous bar mill which the company placed in operation, August, 1948. Billets ranging from 2 to 4 in. are used in the mill. A 32-ft wide by 50-ft long continuous type furnace heats billets up to 30 ft long at the rate of 60 tons per hr and can be oil or gas-fired. Finished products can be either coiled or run onto the cooling bed.

Mechanical repeater used

The author relates the various operating problems that had to be overcome to achieve maximum operating efficiency. Among these were the development of methods for mechanically repeating angles, which was not incorporated into the original design. In May, 1951, the mill rolled 11,779 tons made up of 35 sizes of angles in 267 operating hours. Rated average of production was 3.09 lb per ft.

At the combustion session, Lee Wilson of the Lee Wilson Engineering Co. presented a paper comparing the various types of annealing furnace designs. This was followed by an article entitled "High Temperature-High-Speed Heating for Steel Rounds" given by A. F. Kritscher, development engineer, National Tube Co., in which economies effected by heating methods involving high rates of heat transfer were made.

At a general session held Wednesday, Hjalmar W. Johnson, vice-president, Inland Steel Co., urged engineers to become good business administrators as well as good operating men. The job of coordinating all the specific technical proc-

esses and skills is becoming more complicated each day. He warned that unless the task is taken over by capable engineers, experts in the field of administration will take over the task.

He claimed that engineers with intimate knowledge of the essentials of construction and operation can make great contributions to the organization of men and processes and the selection and the training of personnel.

$20,000 research program

The standardization session held Wednesday afternoon was presided over by Kee J. Gould, chief engineer of construction, Bethlehem Steel Co., and chairman of the AISE standardization committee. Mr. Gould related that among the accomplishments made by the committee during the past year was the final adoption of AISE standard No. 9, "Standards for the Design of Hot Metal Ladles." A sound engineering approach to the design of this equipment is given by this standard which resulted from a $20,000 research program carried out by the AISE.

One of the highlights of the entire convention was given at the afternoon operating practices session on Wednesday. The many possibilities of extrusion to the steel industry were described by Erwin Lowey, president, Loewy Rolling Mill Div. and Hydropress, Inc., in his paper "Latest Development in the Extrusion of Metals."

The article is concerned mainly with the problems involved in the hot extruding of high alloy steels, stainless steel, nickel alloy and other high strength special alloys and the developments that have taken place in the extrusion of these materials.

He pointed out that proper lubrication is one of the major problems since the quality of the product and the durability of the tools as well as the ability to extrude are dependent upon it. The favorable results obtained by the use of glass lubricants in hot extrusion is particularly encouraging for the steel industry, he said.

Salt baths help extrusion

Another major contribution in this field is salt bath heating. The salt performs the function of providing a scale free surface and shortens the time required to heat the billets prior to extrusion, in addition to its function as a lubricant.

Among recent experiments now being carried out are the extrusion of gun tubes of varying sizes made of nickel-chromium-molybdenum steels at temperatures of 2500°F, the extrusion of stainless steel tubing, of multiple hole aluminum tubes from solid billets, billets made from 16-25-6 Timken alloy and the extrusion of titanium bar and rods.

Mr. Loewy went on further to relate that the greatly widening application of hot extrusion of high temperature metals and alloys and the

LOBBY DISCUSSIONS were plentiful. I. N. Tull, left, and V. J. Nolan, center, are briefing W. B. Haus on the highlights of the days' coming events.

increasingly complicated extruded shapes calls for the construction of presses larger than any now in existence in this country.

He described the 25,000-ton extrusion press now being designed which will be capable of extruding two spars of an airplane wing at one time. He also stated that this press will be used to pre hot work cast billets before forging on a 75,000-ton forging press. In addition to the savings in labor, machine time and metals, the parts produced by this method will be of better physical and metallurgical properties and will result in lowering the weight of the planes.

The developments in the field of extrusion offer a challenge to the steel industry for developing and improving hot working steel used as tools in the extrusion of high temperature metals.

"Phosphate Coatings as Lubricants in the Severe Cold Forming of Metals" was the title of a paper delivered jointly by S. Spring, research and development division, Pennsylvania Salt Mfg. Co., Philadelphia, and Dr. Ludwig K. Schuster, chief chemist, Heintz Mfg. Co., Phila.

Part 1—General description was presented by Mr. Spring in which he stated that a phosphate coating may be considered as a "fixed pigment" acting to separate metallic surfaces. The good adherence of the coating to metal, which permits it to withstand large shearing stresses at the die, is primarily responsible for its success. This adherence is determined by surface pre-treatment and the chemical composition characteristics of the phosphate coating as regards its use in cold forming.

In the second half of the presentation, Dr. Schuster discusses the application of phosphate coatings as an aid in cold forming metals. They are limited to those metals which are considerably attacked by dilute phosphoric acid at high temperatures, such as straight carbon and low alloy steels, aluminum and zinc and their alloys. Stainless steel cannot be phosphatized.

New AIR FORCE machinability research report issued

The second volume of the machinability research program sponsored by the Air Force expands the microstructure—machinability correlation developed in the first report. Cutting speed—tool life charts are given for different microstructures of 12 commonly used steels. Latest information on machining titanium and its alloys is given.

A second volume has been added to the report of the vastly significant Air Force machinability research program. The 196-page book, titled "United States Air Force Machinability Report—1951," is published by the Curtiss-Wright Corp., Wood-Ridge, N. J.

The major section of this book—nearly 100 pages—is devoted to presentation in handbook form of machinability data on 12 commonly-used steels. Charts of tool life against cutting speed are correlated with different microstructures of each of these steels, along with general information on microstructure identification. Basic information on the relationship between structure and machinability is reviewed in the book's introductory section. Other sections include a tool life index—microstructure summary, tool life comparisons, and tool wear, temperature, and power data. A final section includes data on machining titanium.

All data obtained in two years of research on the machinability of the 12 common steels are summarized on a large chart of tool life against cutting speed, included with the book.

The first report of this series was published by Curtiss-Wright in 1950 (THE IRON AGE, Nov. 9, 1950, P. 99). It contained a review of metalworking research, including an analysis of the machining process. Also included was a glossary of microstructures, notes on machine tool and cemented-carbide selection, and up-to-date information on the machining of high-temperature jet engine alloys, cast irons, and one alloy steel.

The new volume takes up where its predecessor ended, and is devoted principally to the machining of a wide variety of commonly-used steels. Future books are planned. Additional work on the machining of high-temperature alloys and titanium is already underway, and the research program has been broadened to include grinding.

The work is sponsored by the Air Force's Air Materiel Command, and supervised by R. T. Hurley, President, Curtiss-Wright Corp. Organizations contributing to the second volume include Metcut Research Associates, Lockheed Aircraft, Curtiss-Wright Corp., Chrysler Corp., and the Hyatt Bearings Div. of General Motors.

Microstructure, tool life related

Fig. 1 summarizes in a broad way what the research program has found out about the relationships between microstructure, cutting speed, and tool life. It shows seven microstructures typical of the steels covered in the 1951 report, and is sufficiently accurate for estimating tool life and optimum cutting speed on steels when microstructures are correlated. Chart data was obtained with 78B carbide. Other tool materials would, of course, give different data. The feed per revolution for this chart was 0.010 in. Other tests show

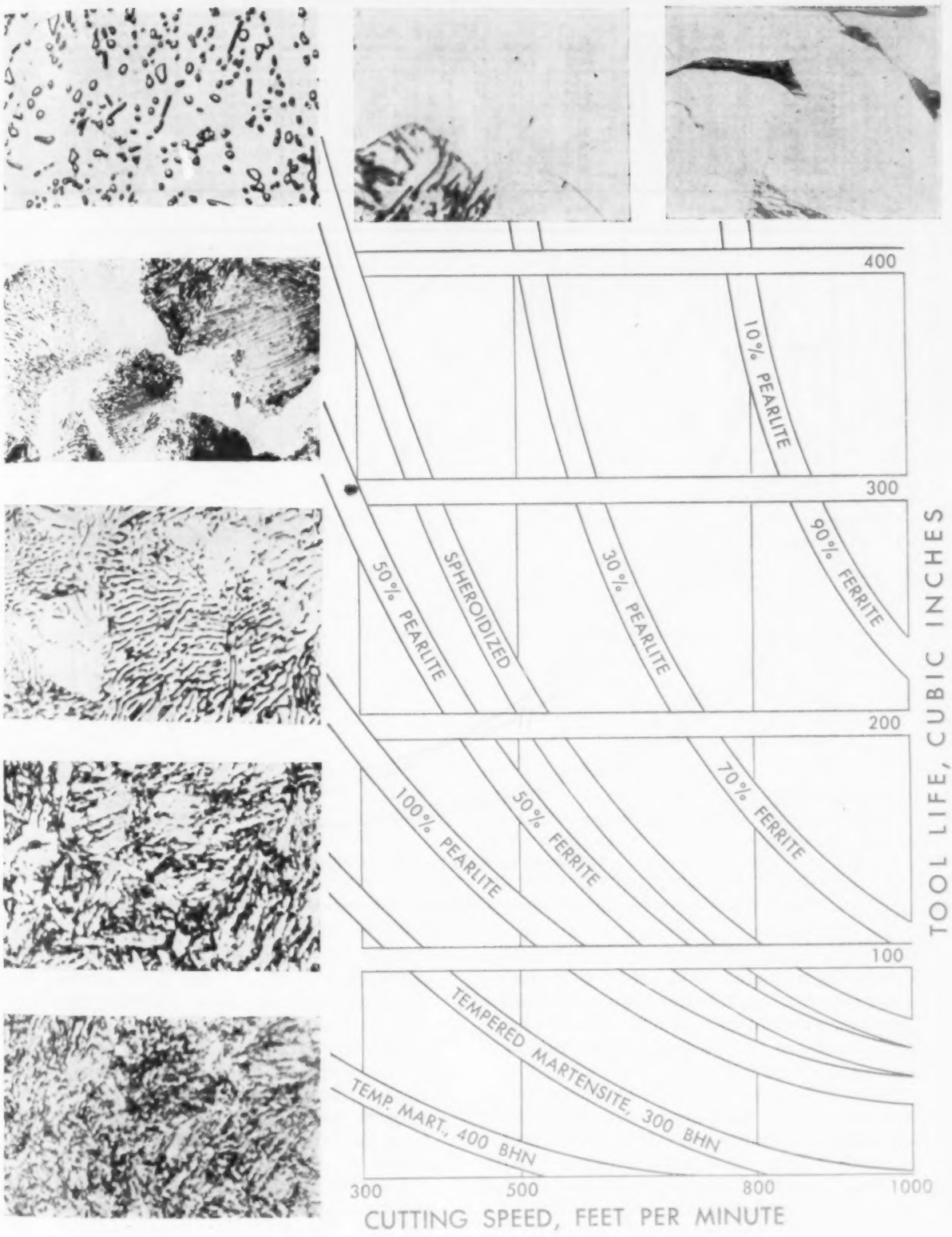


FIG. 1—How tool life varies with microstructure and cutting speed. Machinability increases with structures shown upward and to right. Carbide tool, 0.015-in. wearland. Feed 0.100 ipr. Cut depth 0.010 in. 2000X.

TABLE I

CARBIDE MACHINING OF BEARING RACES

Tool No.	Tool Material	Back Rake, deg.	Side Rake, deg.	SCEA, deg.	ECEA, deg.	Relief, deg.	Nose Radius, in.	Chip Breaker, in.	Cut Depth, in.	Feed per Rev., in.	Tool Life, Pieces per Grind
1	Carbide	6	0	25	15	7	1/16	0.010 x 1/8	1/8–3/16	0.014	11-15
4	Carbide	6	0	25	15	7	1/16	0.010 x 1/8	1/8–1/4	0.008	80-90
5	Carbide	6	0	25	15	7	1/16	0.010 x 1/8	1/8–3/16	0.014	11-15
8	Carbide	6	0	25	15	7	1/16	0.010 x 1/8	1/8–1/4	0.008	80-90
2	Cast alloy	12		45		8-10				0.008	200-225
3	Cast alloy	12		45		8-10				0.008	200-225
6	Cast alloy	12		45		8-10				0.008	200-225
7	Cast alloy	12		30		8-10				0.008	40-45

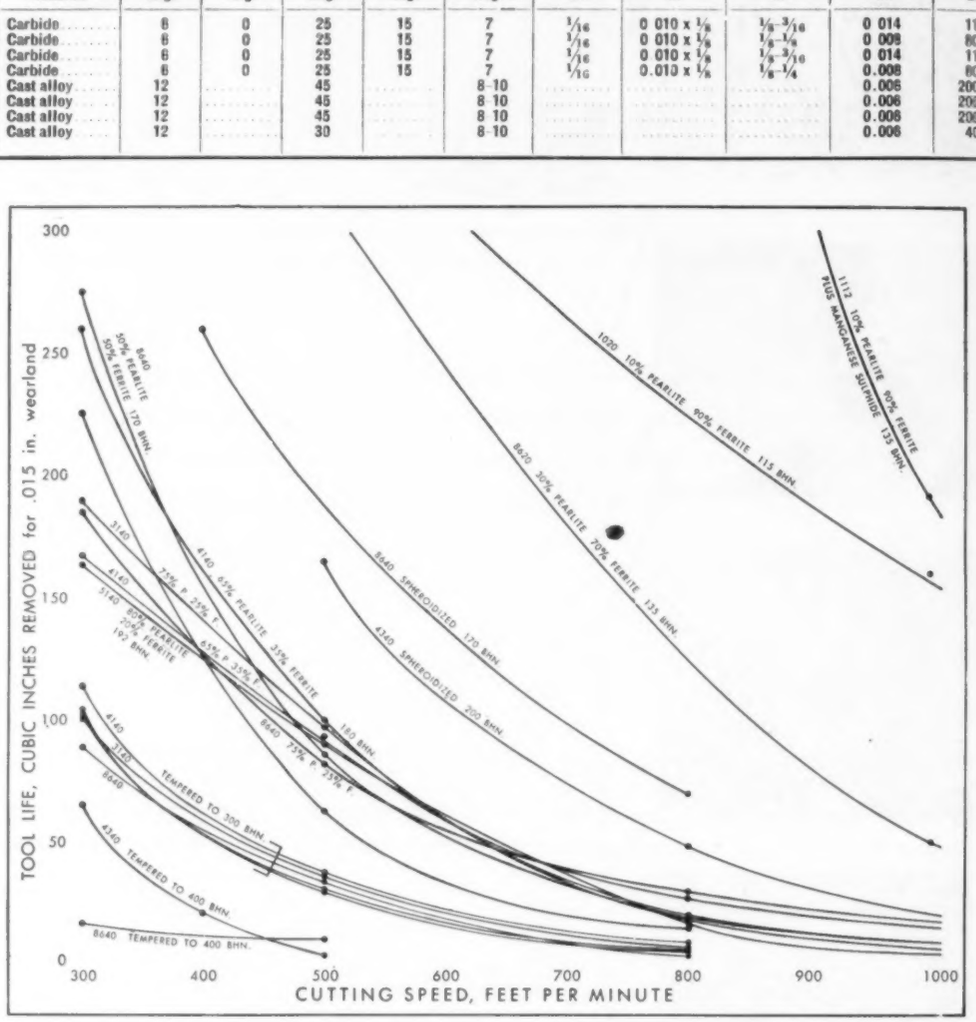


FIG. 2—Tool life at various cutting speeds according to microstructure. Tool used was 78B carbide.

heavier feeds greatly improve tool life, except at very high speeds. Tests made in gathering data for this chart were stopped when a wearland of 0.015 in. was reached. Depth of cut, though not truly a tool life variable, was kept constant at 0.100 in.

Table I gives data obtained in turning roller bearing races on automatic lathes tooled with carbides. The blanks are AISI E52100, forged to shape within 0.250 in. Machining is done in two operations: Boring and turning, and facing and chamfering both ends. Cutting time at 109 rpm spindle speed is 8.1 min, with surface speeds between 322 and 365 sfpm. Floor-to-floor time is 8.9 min. Higher speeds would probably be possible if carburizing steels such as 4620 were used, as they frequently are for bearings.

The vast difference in tool life at various cutting speeds according to microstructure is emphasized by Figs. 2 and 3. They show that at a given cutting speed, the tool life curves fall into bands according to microstructure groups, with the greatest spread occurring at the lower speeds. These two figures summarize much of the data obtained in the machinability research so far, and contain some of the data from the large chart furnished with the 1951 report.

A major phase of the research program is the correlation of cutting temperature with tool life. Some of the same steel structures tested for tool life were tested for cutting temperature, using the same tools. Investigation has shown that carbide tools generate no more heat than high speed steel tools. Their superor performance is due to their greater hardness at high temperatures. High speed steel be-

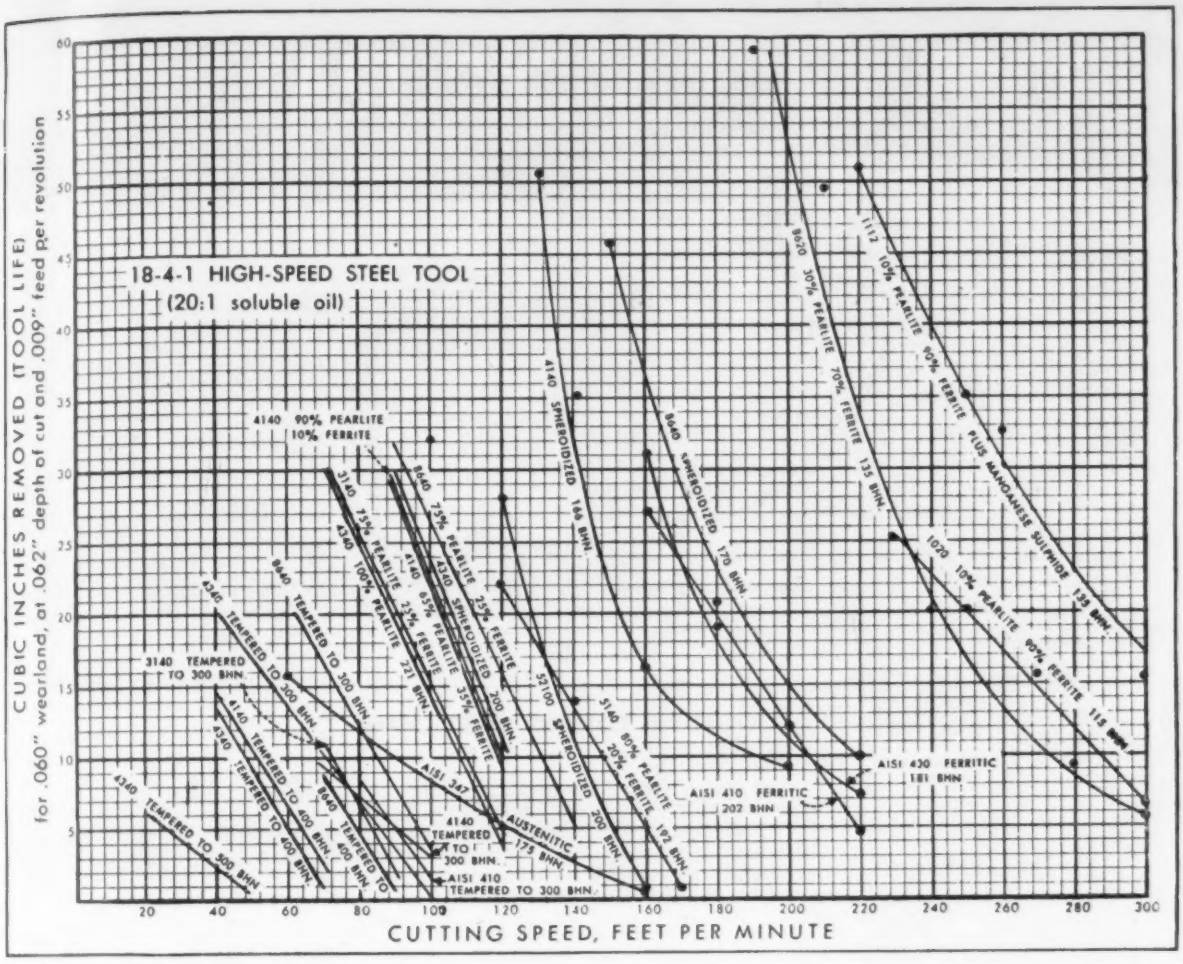


FIG. 3—Tool life at various cutting speeds according to microstructure. Tool used was 18-4-1 high speed steel.

TABLE II

STRUCTURE AFFECTS TEMPERATURE

Cutting Speed Required to Produce 1000°F Cutting Temperature With High Speed Steel Tools

Steel	Structure	Hardness Bhn	Cutting Speed sfpm
1020	10 pct pearlite—90 pct ferrite	103	214
1112	10 pct pearlite—90 pct ferrite plus manganese disulfide	120	185
8620	30 pct pearlite—70 pct ferrite	126	190
4140	Spheroidite	155	120
8640	Spheroidite	156	110
4340	Spheroidite	215	80
8640	50 pct pearlite—50 pct ferrite	200	108
4140	50 pct pearlite—50 pct ferrite	226	112
8640	Widmanstatten structure	295	102
8640	Tempered martensite	265	77
8640	Tempered martensite	254	58
4340	Tempered martensite	317	62
4140	Tempered martensite	330	62
8640	Tempered martensite	375	70
4340	Tempered martensite	400	60

comes too soft to cut effectively at temperatures above 1000°F. Table II gives some of the data obtained in the temperature investigations.

The growing use of titanium, especially in aircraft, prompts the devotion of an entire section of the 1951 report to the machining of this metal. It is a preliminary report, and data are tentative. This investigation is continuing.

Several grades of carbide were used to machine titanium, since there are as yet no grades on the market specifically recommended for this use. Titanium machines, it is found, are much like the austenitic stainless steels. This is an approximation, however. It is more difficult to machine than stainless steels, perhaps being better classified with the high temperature jet engine alloys. But it is like stainless steels in that it is highly work-hardenable and cuts with a tough, springy chip.

Simple turning is the most straightforward operation and the easiest to analyze. The other machining operations, such as milling and drilling, are much more complicated. Thus data on these operations for titanium is still sketchy.

One company finds the 18-14-1 steels best of the high speed tool steels for use on titanium, and cast cobalt-chromium alloys better than carbides, for milling. Sawing is found to be difficult or impossible. Bandsaws appear to be out, hacksaws show promise, and abrasive saws give the best results so far in tests. Low wheel speeds appear best in using abrasive

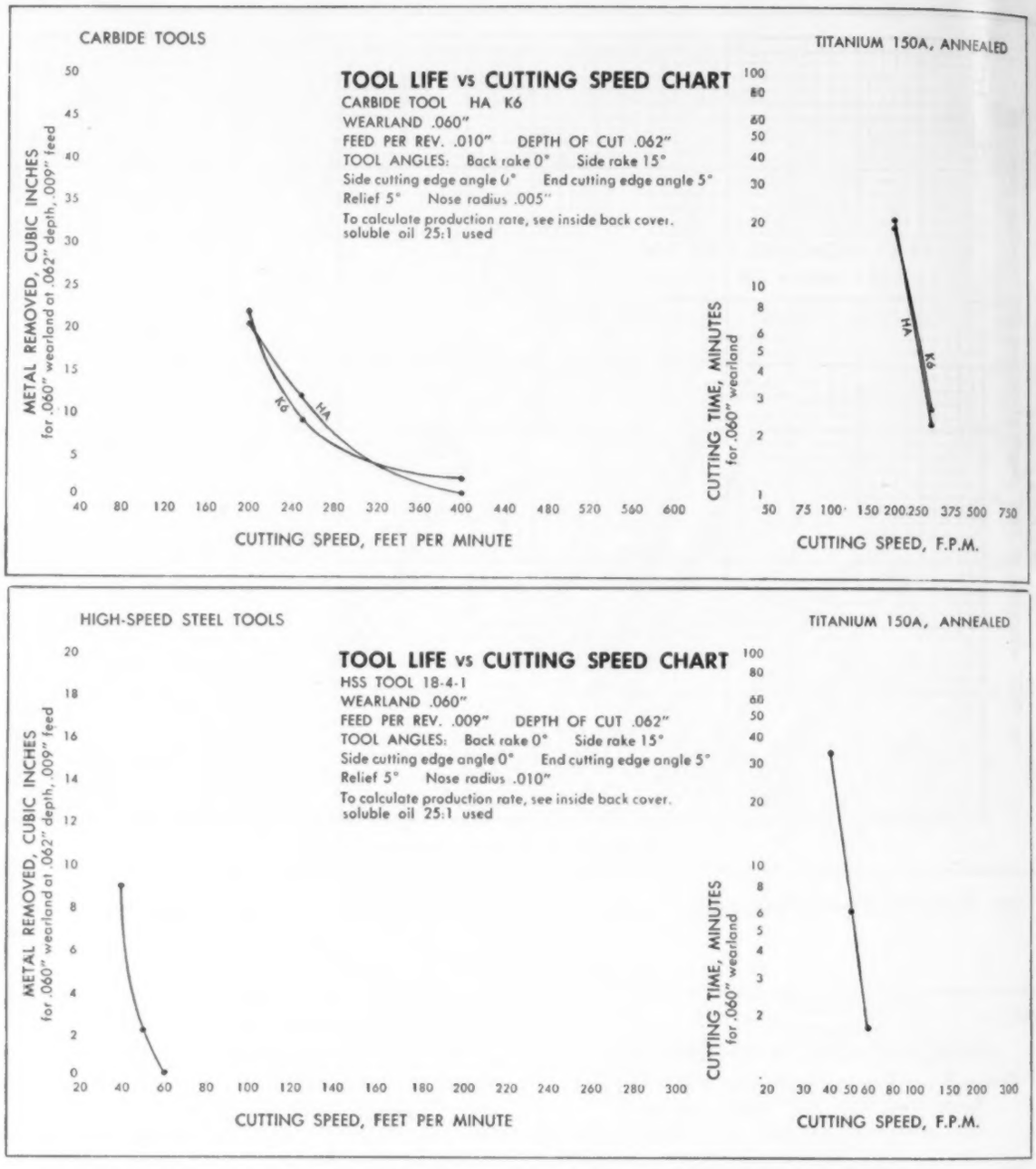


FIG. 4—Machining data for titanium 150A. Top, using carbide tools. Bottom, using high speed steel tools.

Machinability research (continued)

saws, and coarse saws when using hacksaws.

In drilling, as in all machining operations on titanium, feed must never be disengaged during the cut. Workhardening will make it impossible to continue. Pilot holes cannot be used, and enlarging of holes is to be avoided. Eccentric drilling, using the next smaller size drill with the point ground off center to produce the desired size hole, works well.

Fig. 4 gives tool life against cutting speed data for titanium 150A, one of the more common alloys.

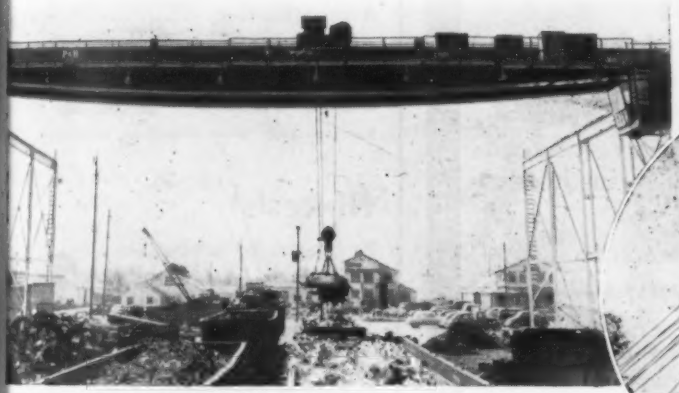
The greater part of the 1951 report is devoted to what amounts to a handbook on machinability of 12 common steels: B1112, C1020, 8620, 3140, 4140, E4340, 5140, 8640, E52100, 430, 410, and 347. For each of these the book gives a composition and properties table, information on the nature and application of the material, general information on machining characteristics, and tool life charts. For many of these, the report gives data on tool life obtained from different microstructures resulting from the heat treatments most commonly applied. For example, AISI 4140 is discussed with 65 pct pearlite—35 pct ferrite, 90 pct pearlite—10 pct ferrite, spherodized, tempered martensite at 300 Bhn, tempered martensite at 400 Bhn, 90 pct pearlite—10 pct ferrite plus manganese sulfide, and tempered martensite plus sulfide.

WHERE FAST PICK-UP *Ups* PROFITS

Fast circulation of scrap is paying a good return now! And at today's high prices, efficient and modern equipment raises the rate of return. The EC&M ALL-WELDED Lifting Magnet *sweeps clean* all incoming shipments, reduces baler charging-time with full lifts—and the EC&M Automatic-Discharge Controller cuts down the time between magnet trips. The adjustable feature gives fast, clean releases without waiting and with minimum spillage. *When buying electric cranes, it pays to specify both EC&M Control and Magnets.*

For COMPLETE FACTS—Ask for No. 29 ACCELERATOR Bulletin

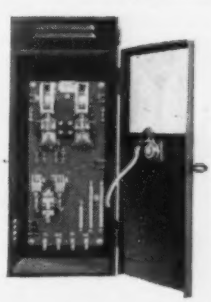
SAVES PREPARATION TIME—10-Ton Gantry Crane with EC&M Control and No. 6D EC&M ALL-WELDED Magnet.



HIGH TONNAGE OUTPUT—One of many overhead scrapyard cranes equipped with EC&M Crane Control and EC&M Magnets.

SCRAP GATHERED FAST with NEW EC&M Magnet on runabout cranes.

ALL-OUT! EC&M Magnet sweeps car bottoms clean—keeps material on the move.



Adjustable EC&M Controller *improves* magnet operation—for use with any make or size of magnet.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

—Free Literature—

Continued

Materials handling

Efficient handling of raw and finished materials, their proper storage, and how modern materials handling machines can expedite manufacture to cut costs and save time and money is the theme of the newest Clark booklet *Basic Facts About Materials Handling.* Methods of figuring job costs, amortization of machine investment, and fixed and variable charges from job to job are included. *Clark Equipment Co.*

For free copy insert No. 14 on postcard p. 121

Power conversion

A new two-color booklet on metallic rectifier power-conversion units has been published. The bulletin describes features of the equipment, its application and operation. A specification guide for dc power supplies and exciters is included, as well as complete rating charts and dimensions. *General Electric.*

For free copy insert No. 15 on postcard p. 121

Ni-Resist

Engineering properties and applications of Ni-Resist are presented in a new 36-p. bulletin describing eight types of austenitic nickel alloy cast irons. Applications and comparative service data in many industries are presented to show ability to withstand corrosion, heat, wear and low temperature. High or low controlled expansion, magnetic or non-magnetic properties and resistance to thermal shock add to the alloy's usefulness. *International Nickel Co., Inc.*

For free copy insert No. 16 on postcard p. 121

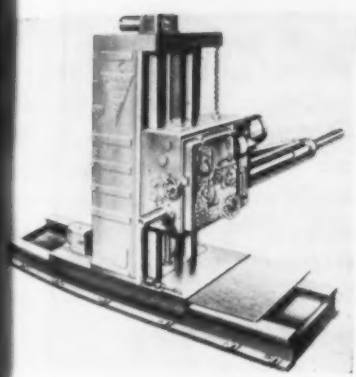
Motor controls

An 88-p., new edition of *Controlog*, a digest of motor controls, has been released. Essential information on a complete line of Clark ac and dc motor starters, control centers, contactors, relays and other accessories is presented. Open and closed views of more popular items, general descriptions, applications, enclosures and outline dimensions are given. *Clark Controller Co.*

For free copy insert No. 17 on postcard p. 121

NEW equipment

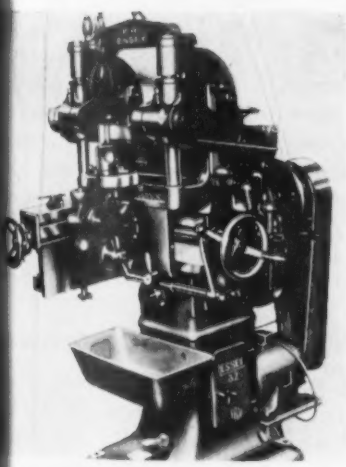
New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 121 or 122.



Has unusual power and wide range of operations

Column rigidity, increased power, greater range of movements, simplified operation and power positioning have been built into this horizontal machine to provide efficient high production on large, unwieldly work pieces and on small production parts. The machine will drive boring fixtures and perform efficient drilling, reaming, boring, counterboring, tapping and spotfacing operations at the highest speeds and feeds possible with modern cutting tools. A 4-in. diam spindle with 42-in. spindle travel is driven by a 10 to 20 hp motor. The spindle is fitted with No. 5 or No. 6 Morse taper with 18 speed changes through sliding gears actuated by a direct reading dial selector lever. *Kaukauna Machine Corp.*

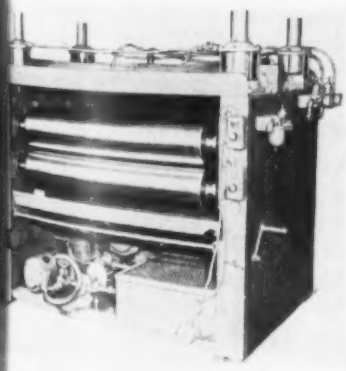
For more data insert No. 18 on postcard p. 121



Punch shaper machines direct from the solid

The punch shaper, now manufactured by E. H. Jones Co., machines a blanking punch, hob or profiled part direct from the solid, using simple tools and eliminating the necessity for making special punch holders or plates. The machine is set up simply and is said to obtain fine surface finish with a high degree of accuracy. In most cases punches can be completely finished on the machine. The cutting tool is the ordinary shaping tool, with stroke like that of a conventional shaper set vertically and adjustable from 1½ to 4¼ in. Upon completion of the predetermined straight stroke, the rocker arm operates in a swivel motion, finishing off the desired radius. A microscope attachment directly above the work permits following the layout lines closely; limits can be achieved without difficulty. *British Industries Corp.*

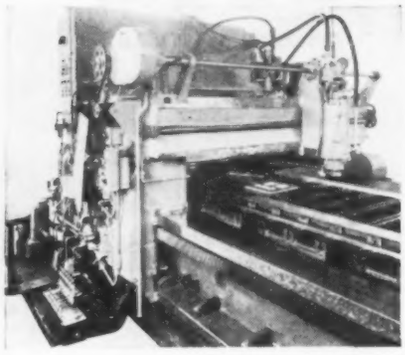
For more data insert No. 19 on postcard p. 121



Compound spreaders designed to fit any need

The function of the roller coater is to uniformly apply drawing compounds to sheet steel prior to the drawing operation. The machine shown is equipped with three pairs of rolls. The first pair is of hardened steel and is used for deburring the stock. The second pair is Neoprene-covered and is used for actual application of the compound. The third set of rolls is hardened steel and used primarily as squeegee rolls for wiping off excess compound and for forcing remaining compound into the pores of the metal. A circulating pumping unit feeds the coating rolls. Models are built in sizes to fit any stock up to 96 in. *Union Tool Corp.*

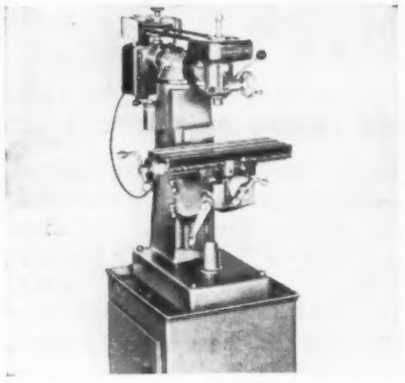
For more data insert No. 20 on postcard p. 121



Aircraft parts produced faster and easier

The InvoMill, an automatic, electronic-controlled power feed router and skin mill is said to rout thicker stocks of aluminum and other nonferrous metals than heretofore possible with hand feed routers. It is of particular importance in making grids that hold gas tanks and other parts inside aircraft wings. A 30 hp motor supplies ample power for routing aluminum stock 1 in. o more thick. With the InvoMill, ski milling of large aluminum piece used to form wings is also possible A 40 hp, 5400 rpm direct-driven liquid cooled motor provides th power. Table is 72, 84 or 96 in wide; bed lengths in multiples o 15-ft sections. *Onsrud Machine Works, Inc.*

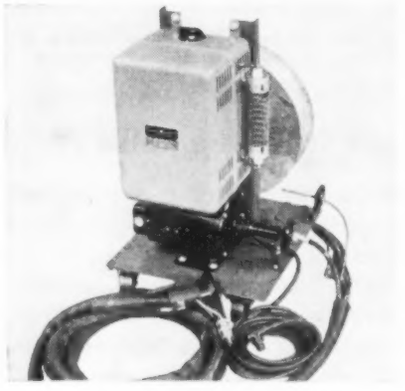
For more data insert No. 21 on postcard p. 12



Vertical mill features accuracy of operation

Designed to handle accurate work, a vertical milling machine has rigidity, flexibility and wide range of operation. All feed screws are precision ground and mounted in pre-loaded ball bearings. Dials are unusually large—2 3/16 in. diam and graduated into 100 increments. A milling unit provides spindle speeds, with a 1725 rpm motor, of 180 to 1000; 350 to 1900; and 60 to 3250 rpm. Quill travel is 2 1/1 in. A handle and wheel feed ar provided for drilling and boring op erations. The machine has 12-in longitudinal feed; cross feed, 4½ in.; vertical feed of knee, 12 in.; maximum distance spindle to table 12 in. *Johansson & Windle Co.*

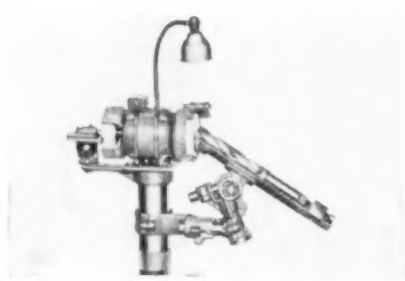
For more data insert No. 22 on postcard p. 12



Attachment speeds alloy-metal welding

Fillerweld is a new product designed to speed alloy-metal welding on applications where filler-metal must be added. Used with gas-shielded arc welders, the unit allows the operator to control the continuous flow of filler metal without breaking the arc, resulting in a smoother, faster weld. Two main elements comprise Fillerweld: the torch or gun, and a mechanical power unit. The gun is a manual water-cooled Inert-Arc tungsten holder with a control switch and a gear assembly for pulling the filler metal from the spool to the ar through the gun. The power uni consists of a motor that provide power for drawing the filler-metal a unit for controlling the motor, and a spool that holds the filler wire. Fillerweld is portable. *General Electric Co.*

For more data insert No. 23 on postcard p. 12



Improvements added to drill and carbide grinder

Among the several refinements added to the Sterling drill and carbide grinder is a simplified adjustment to compensate for grinding wheel wear, improving the accuracy of setting the machine for various drill diameters. A diamond wheel dresser is permanently mounted on the drill grinding wheel guard; when not being used it swings back out of the way. A graduated quadrant makes it simple to set clearance angles accurately. *McDonough Mfg. Co.*

For more data insert No. 24 on postcard p. 121

Holder designed for comfort and efficiency

Designed for the comfort of the welding operator, the Caddy electrode holder has a spring assembly engineered to give uniform pressure when inserting or ejecting electrodes. A handguard protects the hand from spatter, arc and reflected heat. Greater heat dissipation by channel construction of the body gives twice the surface area yet retains maximum strength. Cable connection to the stud is by the Cadweld process. *Erico Products, Inc.*

For more data insert No. 25 on postcard p. 121

Analysis speed

Said to be a relatively new method high frequency induction heating for burning iron and steel samples for combustion carbon analyses is exemplified by the Leco 1H-10 high frequency induction furnace. Equipped with a jet combustion tube, the device actually jets the oxygen into the sample, where it is immediately consumed, insuring instantaneous starting of combustion and complete burning of the sample. Temperatures are in excess of 3000°F which makes all types of steel amenable to rapid and complete combustion. *Laboratory Equipment Corp.*

For more data insert No. 26 on postcard p. 121

Solid heads

Long service life and ability to handle high speeds and extremely heavy cutting loads are claimed for new Superweld tools having solid heads of high speed steel welded to shanks. Heads are of equal section to the tool shanks and joined to the shanks by electrical butt-welding. Thirty-one standard shapes are available. Superweld tools are also custom made to user's specifications. *A. Milne & Co.*

For more data insert No. 27 on postcard p. 121

Measuring crankshafts

A new micrometer handles most crankshaft diameters since the instrument has a 3-in. frame with a range from 1½ to 2½ in. The reading point, the longitudinal line on the sleeve, is on the under side of the thimble, plainly visible while measuring. *L. S. Starrett Co.*

For more data insert No. 28 on postcard p. 121

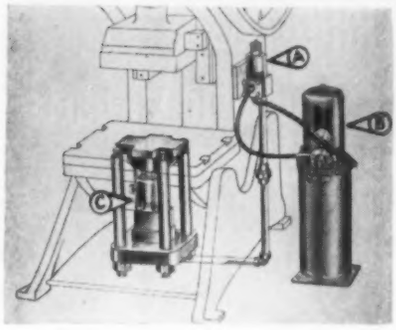
Industrial gamma tube

A rugged, stainless steel tube has been designed for industrial process control procedures using gamma rays, and for cosmic ray counting. It gives good response over a considerable temperature range. Supplied with a standard sensitive length of 12 in., the new tube is available upon special order in 5 to 20-in. lengths. *Tracerlab, Inc.*

For more data insert No. 29 on postcard p. 121
Turn Page

New Equipment

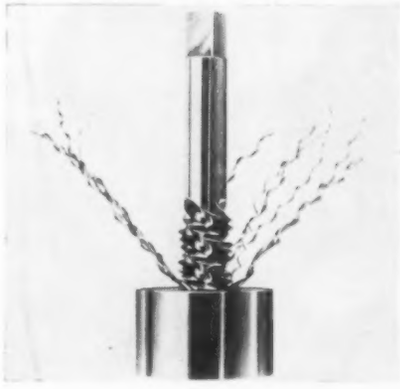
Continued



Press bed jack

An improved hydraulic press bed jack is fastened directly to the bolster plate or press bed frame to protect a power press from overload damage. It assures constant working pressure at point of operation and compensates for variation in material thickness. *Dayton Rogers Mfg. Co.*

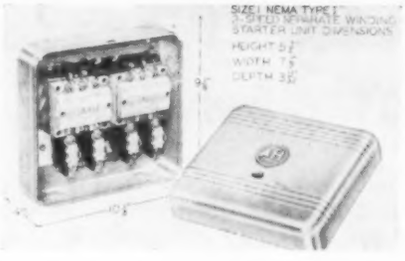
For more data insert No. 30 on postcard p. 121



Thread broaches

Thread cutting broaches are stocked and available in all popular sizes of both right hand thread and the new left hand thread cutting type. Made from the finest grade of high speed steel, they are precision ground from the solid after hardening. The manufacturer states broaches produce perfect threaded holes by a true shearcut broaching action. *Shearcut Tool Co.*

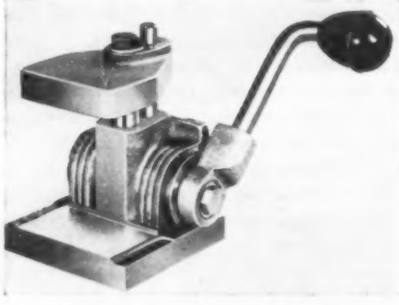
For more data insert No. 31 on postcard p. 121



Motor starters

Two new motor starters extend the scope of the Arrow-Hart RA magnetic starter line to include reversing and multi-speed motors. Both feature the company's right angle operation mechanism. *Arrow-Hart & Hegeman Electric Co.*

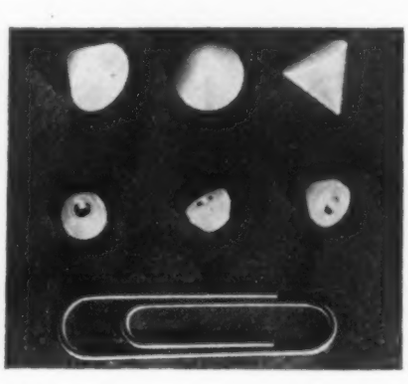
For more data insert No. 34 on postcard p. 121



Small drill jig

A single-post drill jig combines small-size economy with accurate alignment and touch-release locking. The B-6 Mijit provides an infinite number of locking positions that cut loading and unloading time to seconds. Locking is positive. *Esco Engineering Co.*

For more data insert No. 33 on postcard p. 121

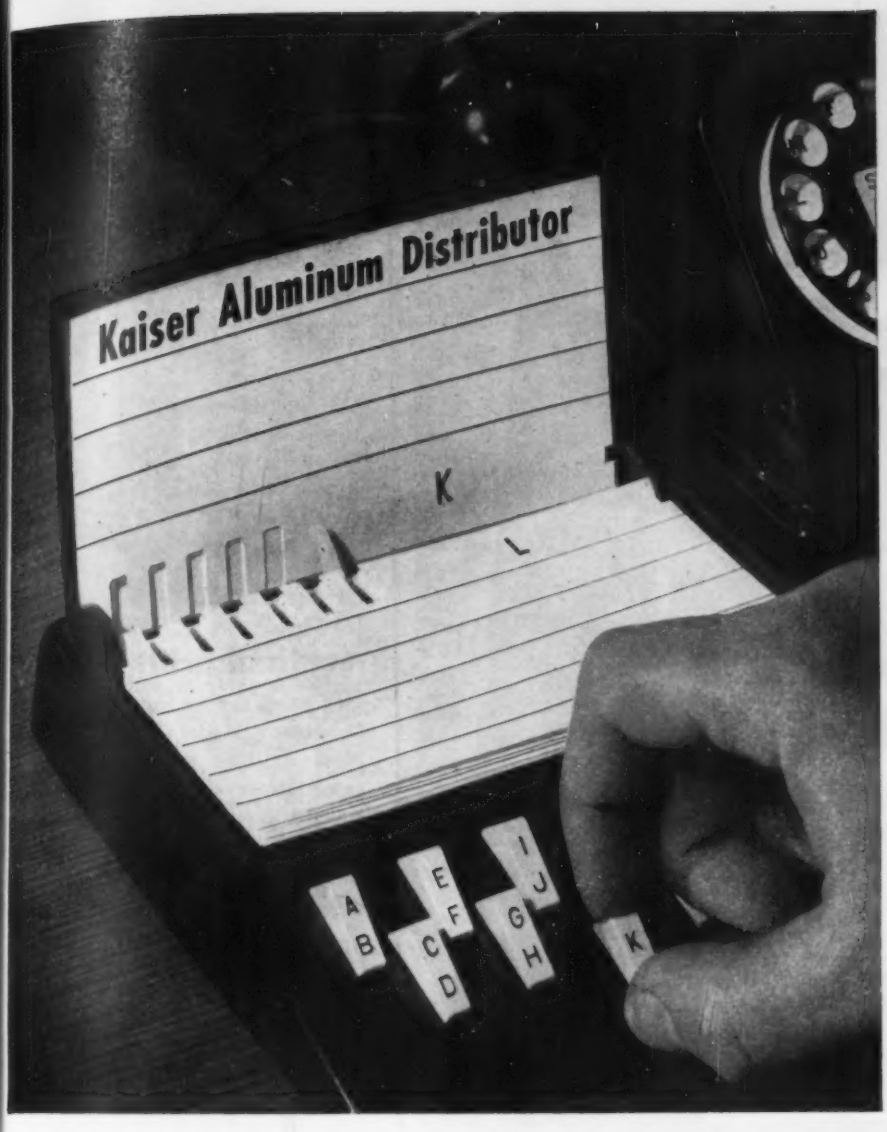


Nylon valve seats

Fifteen to 20 years life under ordinary service conditions is estimated for valve seats machined from nylon rod. The small seats are made for use in oxygen, hydrogen and helium regulators, and for high pressure aircraft check valves. *Bastian-Blessing Co.*

For more data insert No. 32 on postcard p. 121

Turn to Page 130



Worth knowing—he's growing!

Your Kaiser Aluminum Distributor is now adding facilities to handle a sizable increase in his aluminum stocks.

For Kaiser Aluminum is expanding its production of primary aluminum by 80%.

As soon as it becomes available, it will mean more aluminum for your distributor ... more for *you!*

Meanwhile, remember this: Your Kaiser Aluminum Distributor will assist you in every way possible to obtain defense orders. He will help you specify the type of aluminum your product requires. He can often suggest methods of using aluminum more economically or of converting to more available forms. He can advise you of future availabilities, supply experimental quantities, meet emergency needs.

Equally important, Kaiser Aluminum Warehouse Distributors offer you the cost and service advantages shown in the side panel.

Your nearest Kaiser Aluminum Distributor is listed at the left. Call him TODAY.

Kaiser Aluminum

Setting the pace ... through quality and service

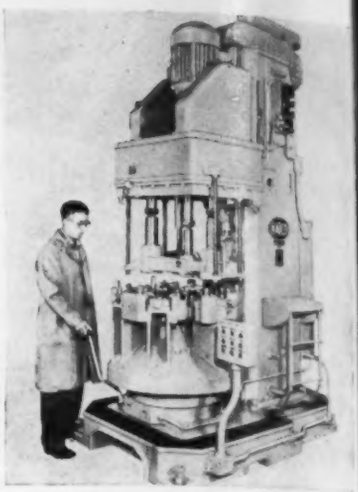
HERE'S HOW INVENTORY PROGRAMMING HELPS YOU:

MORE VERSATILE INVENTORY—Warehouse stocks give you the opportunity to select from a complete range of alloys and forms perfectly suited to every production demand.

LOWER RAW MATERIALS INVESTMENT—Daily delivery to machine side eliminates tying up your dollars in idle or obsolete inventory; improves your current capital position.

LOWER HANDLING COSTS—Specialization of plant and handling equipment permits machine side deliveries at lower cost than possible in most fabricating plants, cuts stock keeping and accounting costs.

SMALLER SPACE REQUIREMENTS—Space necessary to house your average raw material inventory can be devoted to production. Becomes a source of income rather than an expense.



Vertical drill

Designed for an automotive manufacturer a Model C2A vertical Hole-steel drilling machine drills and semi-finish reams 20 connecting rods and caps per hr. It has a flat slide upon which is mounted a fixed center gear driven head containing four spindles mounted in anti-friction bearings. Its rotating table is 24 in. in diam, three-position manually operated. A Natco three-position fixture accommodates one connecting rod and cap in each position while performing the following operations: Position 1—Remove and load one rod and one cap. Position 2—Core drill one hole in rod. Drill one hole in rod. Position 3—Core drill one hole in cap. Semi-finish ream one hole in rod. *National Automatic Tool Co.*

For more data insert No. 35 on postcard p. 121

Torque converter

The new Model DF twin disk hydraulic torque converter for off-highway trucking application is said to eliminate 99 pct of the forward gear shifting and, with engine drag, to be able to perform 90 pct of the down-hill braking. The operator's control valve is equipped with four selections: neutral, torque converter drive, mechanical drive, and combined engine and hydraulic braking. The torque converter is made up of three major assembly groups. *Twin Disc Clutch Co.*

For more data insert No. 36 on postcard p. 121

All-purpose cleaner

Magnus 751, an all-purpose cleaner for metal parts, cleans at high speed, penetrating, loosening and removing all foreign deposits. Cleaning costs are low because the solution has extremely long life. It can be used hot or cold and is followed by a cold water rinse. It is safe for all metals; not attacking, pitting or marring. *Magnus Chemical Co.*

For more data insert No. 37 on postcard p. 121

Tape hook

A detachable hook with handy ring for finger hold is designed for ready attachment to any Starrett ¼ or ⅜-in. wide steel tape. When used, it greatly facilitates unassisted measuring of long pipe, casings, steel sheets, lumber and similar materials. *L. S. Starrett Co.*

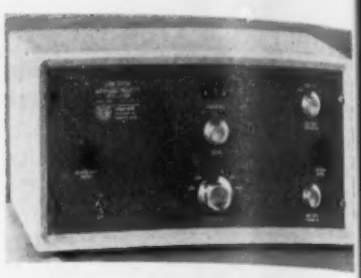
For more data insert No. 38 on postcard p. 121

Cools drill press

A new 30-gpm coolant unit Model 10-10 is portable and will pump up to 12 ft. It was designed to furnish ample cooling for an 8 to 10 spindle drill press, and may be used on single spindle drill press, lathe, broaching machine, cut-off machines or cutter grinders either singly or changed to feed three or four different machines at the same time. This model is self-contained; has ¼ hp, 110 v, 60 cycle motor, built-in switch, semi-floating impeller balanced for efficient operation. Aluminum casting pump housing is tapped for 1-in. pipe. Container holds 11 gal. *Shellback Mfg. Co.*

For more data insert No. 39 on postcard p. 121

Turn Page



Ultra-LF oscillator

Suitable for geophysical and seismological instruments, for design and development of servo-mechanisms, and for vibration controls, a new, wide range, ultra-low frequency oscillator combines the sub-audio with the normal audio frequencies and provides both sine and square wave outputs over the entire frequency range from 0.02 to 20,000 cps. Six frequency bands are provided, each covering a full decade with continuous control of frequency. The instrument features low distortion and hum level, constant output impedance, excellent stability and amplitude constancy. *Krohn-Hite Instrument Co.*

For more data insert No. 40 on postcard p. 121

Radiation probe

A lightweight radiation probe, for detecting and measuring alpha, beta, gamma, and neutron radiations is designed for use in industrial and university laboratories where work with radioactive materials is being conducted. It has application in monitoring contamination of clothing, personnel, laboratory equipment and facilities. The scintillation counter includes a phosphor, photo-multiplier tube, and a two-stage amplifier with low-impedance output. Light flashes, produced when nuclear particles strike the phosphor, are converted into electrical pulses by the photomultiplier, allowing detection under even the most difficult circumstances. *General Electric Co.*

For more data insert No. 41 on postcard p. 121

Technical Briefs

Blast Furnaces:

Oxygen lances reduce silicon content in British experiments.

Experiments with the oxygen lance by Brymbo Steelworks, England, have lowered the silicon content of blast-furnace iron. The trials so far have used oxygen from 2000-cu ft capacity cylinders. Large equipment will also be tried.

To insure adequate agitation and mixing during blowing, without excessive loss due to splashing, contents of the blast furnace's 20-ton ladle are poured into a larger, 30-ton ladle. Near the end of this operation, the 1½-in. diam lance is inserted and blowing commences. Blowing continues for some 10 to 15 min, at about 100 cu ft of oxygen per min.

HOT METAL ANALYSES, PCT

	Si	S	P	Mn
Before lancing	0.86	0.052	0.53	1.20
After lancing	0.48	0.040	0.47	1.00
Before lancing	1.03	0.067	0.59	1.30
After lancing	0.79	0.048	0.52	1.15
Before lancing	1.12	0.072	0.57	1.60
After lancing	0.88	0.044	0.60	1.35
Before lancing	1.24	0.056	0.62	1.60
After lancing	0.88	0.048	0.55	1.55

To form a fluid and easily remove slag, 5 cwt limestone chips, ½ cwt fluorspar and 30 lb soda ash blocks are charged into the bottom of the large ladle.

Four blows have been carried out. Some 18 tons of iron were treated with from 1200 to 1500 cu ft of oxygen. Analyses of the four melts are given in the accompanying table.

Slag after blowing assayed: CaO, 32 pct; SiO_2, 34 pct; Al_2O_3, 11 pct; MnO, 9 pct; Fe, 5; S, 1 pct. An estimated temperature increase of 86° to 104°F took place during lancing.

Disregarding the chemical action of limestone and soda ash, the oxygen was used at a rate of 24 cu ft per 0.1 pct Si per 1 ton iron.

Turn Page

Coating Improves Vacuum Tubes

Secondary emission, back emission and photoelectric effects in thermionic tubes employed for receiving and transmitting can be minimized by the use of an aqueous dispersion of Acheson "dag" colloidalized graphite.

Being resistant to electron bombardment, a graphite coating on a grid protects this metallic member from the impact of primary particles, thus greatly reducing the emission of secondary electrons.

The thermal radiation properties of graphite are utilized to keep grids sufficiently cool to prevent primary emission. The graphite may be applied directly to the tube member with or without such preliminary treatments as acid etching, sand blasting or oxidation. However, a surface which is rough as well as black radiates more effectively

Because of its low photoelectric properties, colloidal graphite, when applied to tube parts, renders them practically free from the effects of such electro-magnetic radiations as light and Xrays.

Experiments on Manganese

Electrolytic manganese with a purity of 99.9 pct has been produced with a chloride electrolyte. Low-grade ore from the Three Kids Mine, Las Vegas Wash, Clark County, Nev., was used. The process is described in a Bureau of Mines report.

Although previous experiments, conducted in the Bureau of Mines Electrometallurgical Laboratory at Boulder City, Nev., had resulted in successful electrowinning of manganese, there was an indication that a chloride process might have certain advantages over a sulfate process. This report contains the result of the use of the chloride tested on a semi-pilot-plant basis.

The report includes details of the crushing, grinding, roasting processes, the solution purification and data pertaining to the electrolysis. While no economic comparisons between the sulfate and chloride processes is offered, it was indicated

that the latter would be more difficult and expensive to operate.

A free copy of "Report of Investigation 4817" may be obtained from the Bureau of Mines, Publications Section, 4800 Forbes St., Pittsburgh.

Aluminum:

increases production, improves quality in the textile industry.

To obtain an accurate appraisal of the contributions that aluminum is making to the textile industry, a survey of equipment manufacturers and mill operators has been made by the Aluminum Association and the Textile Information Service.

Aluminum's versatility has made it adaptable for many uses in the textile industry. Its familiar quality of light weight is important in the many textile machinery parts that rotate or reciprocate at high speed.

Virtually all form of the metal are found in textile machinery and equipment—sheet, extrusions, tubing, castings, and forgings. High humidity is customary in many of these mills, but moisture condensing on aluminum surfaces will not create rust to stain yarns or fabrics. Aluminum is also resistant to corrosion by most chemicals employed in processing synthetic fibers.

Because these parts have a high degree of dimensional stability, particularly as compared to wooden parts, it is possible to maintain better dynamic balance of machine parts operating at fast speeds. This results in less vibration at high speed and lower operating costs. Also, aluminum parts seldom need to be painted for protection.

Among the various types of parts and equipment made of aluminum are: scale pans, rails, separator blades, take-up tubes, bobbins, beams, spools, loom components, heddle and harness frames. Tanks, ventilating equipment, containers, vats, trucks and racks are also made of this metal.

—Technical Briefs—

Foundry Matchboard Costs Cut

The plastic-surfaced plywood produced by Georgia-Pacific Plywood Co. has made its debut in the foundry field. This took place at the Cooper Alloy Foundry Co., Hillside, N. J., producer of stainless steel castings.

Previously Cooper Alloy mounted the majority of its patterns on boards made from pattern lumber, the usual foundry practice. The cost of making a conventional 2-ft matchboard was $15.00. By using plastic-surfaced plywood, the company discovered the same matchboard could be produced for only $2.40.

Foundries have been putting up with lumber mounting boards, despite their shortcomings. Experience had indicated that mounted patterns are much more suitable for production work. Both lumber and uncoated plywood has a tendency to warp and shrink and pattern makers must paint and shellac the boards to minimize these tendencies.

Wins Foote Lithium Award

WINNER: Robert S. Weisz, 33, research engineer at RCA Laboratories, has received the grand award in Foote Mineral Co.'s lithium award program for his paper "Ferromagnetic Spinels Containing Lithium." Mr. Weisz won the Sage Fellowship in Chemistry in 1941 and was later a Westinghouse research fellow.

Steel Fears Another Washington Wage Settlement

Some Administration forces greasing the skids for another wage round . . . Wages can't be raised without raising prices . . . Defense chiefs get CMP suggestions from industry.

Fear is growing that the steel industry won't have much to say about granting a steel wage increase this year. Washington forced the issue in 1950 and is quietly planning to do the same thing this year. There will be window-dressing protests from some Administration sources but others are privately preparing to grease the skids for another round.

Wage Timetable—The pattern is expected to develop about like this: (1) Union will demand a large package—15¢ an hr or more, and perhaps including a guaranteed annual wage. (2) Steel people will turn them down on the basis that wage increase can't be granted without a price increase. Thus, a stalemate. (3) Then will come threat of a nation-wide strike in basic steel industry, paving the way for White House intervention and appointment of a fact-finding group. (4) Some way will be found to allow a wage increase. Unless a similar attitude is taken on steel prices, there will be labor trouble and plenty of it.

Mounting Costs—Steel wages and prices have not been raised since last December. Then steel workers hammered out a 16¢ an hr increase and steel prices were raised an average of $5.88 a ton. But that price increase did not reflect other accumulated cost increases which at that time amounted to $4 a ton of steel. The total of these accumulated costs now is much greater—and is still rising. These costs include materials, freight, coal, labor, and administration. (It now takes 15 copies of a steel order to book, produce, and bill it.) Also, expansion costs have risen.

Firm Policy—Steelmakers aren't kidding when they say that steel wages can't be raised without raising prices. This has been their policy for a long time, and they haven't changed their minds. In view of inflation, their earnings have been only passable and have resulted almost entirely from a very high operating rate.

They can not help feeling chagrined that the wage question once again is headed toward a White House settlement.

Bug Control—Mobilizer Wilson and Administrator Fleischmann have been given suggestions by steel leaders on how to improve steel distribution. The suggestions were contained in a report last week which Mr. Wilson had requested following a down-to-earth meeting between himself, Mr. Fleischmann and steel people.

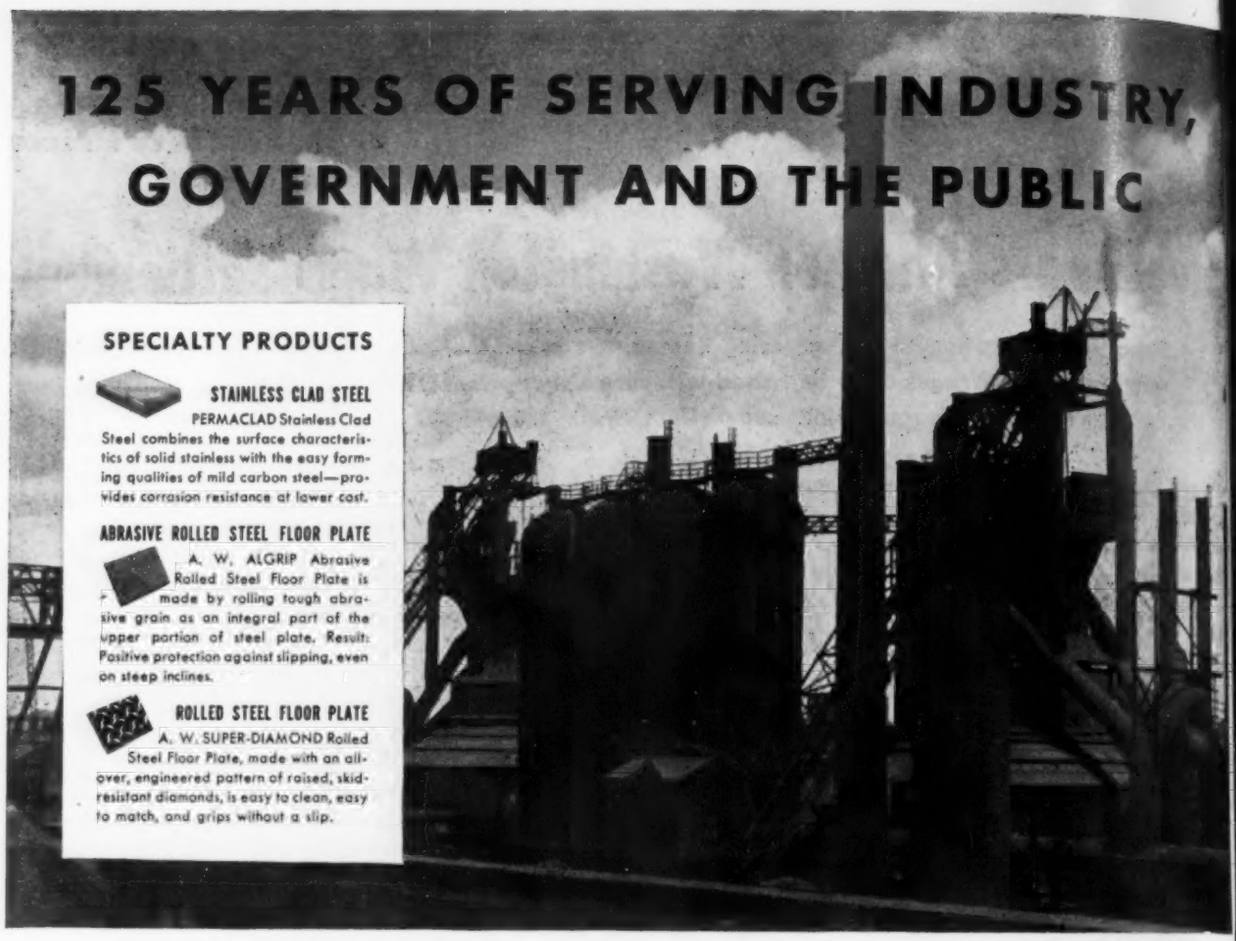
Some of their suggestions involve: (1) A more realistic attitude by the requirements committee which determines what share of total supply each claimant agency or group shall get. (2) Closer relationship with the screening committee of NPA's Steel Div., so that its recommendations will carry more weight.

Cotton Wall—Outside the current tete-a-tete between defense officials and steel leaders it has been known for some time that top policy committees aren't always composed of men who know industry problems best. Committees with less authority but more knowledge of industry needs have sometimes butted their heads against a cotton wall.

Nobody likes the way National Production Authority is making good on its promise that a lot of steel orders would be cancelled, thus opening mill space for unhonored Controlled Materials Plan tickets. NPA has ruled that steel shipped after the first 7 days of a new quarter must be applied against allocations for that quarter. This will slash a lot of carryovers that were thought to be perfectly good orders.

Strange Choice—The buyer has his choice: He can cancel this (carryover) order. Or he can take delivery on this order and cancel part of his fourth quarter order. Either way he has to cancel; he can't have both. Some steel users holding carryover CMP orders are ruffled because they feel that NPA special directives have sidetracked their orders making them carryovers.

It's interesting how this situation developed. NPA issued more tickets than there were seats for the third quarter production performance. Industry criticized. NPA blamed duplicate orders for the mess, said cancellations would clear everything up. Industry doubted. When cancellations weren't forthcoming, NPA started policing orders. Detective work uncovered only an infinitesimal amount of duplication. Then NPA said cutbacks would clear the way. They didn't. Now they have slashed carryovers. This will bring CMP into balance. But it will make a lot of sore noses, too.



ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

We proudly mark our 125th year of iron and steel making experience and pledge ourselves to work diligently to help keep America strong. At present we may not be able to supply all of your requirements for steel but we want you to know that we are doing everything within our power to expand our capacity so we can continue to serve Industry, Government and the Public.

PRODUCTS OF ALAN WOOD STEEL COMPANY

IRON PRODUCTS
"Swede" Pig Iron
Foundry, Malleable, Bessemer and Basic

STEEL PRODUCTS

PLATES (SHEARED)
Tank, Ship, Boiler, Flange and Structural Qualities
Furnished in carbon, copper, or alloy analyses
A. W. Dynalloy (High Strength Plates)

HOT ROLLED SHEETS
Special qualities in carbon, copper, or alloy analyses
A.W. Dynalloy (High Strength Sheets)

HOT ROLLED STRIP
Coiled and cut lengths
Carbon, copper, or alloy analyses

A.W. ROLLED STEEL FLOOR PLATES
A.W. Algrip Abrasive
A.W. Super-Diamond Pattern

STAINLESS-CLAD STEEL
Permaclad Sheets and Plates
Standard and special qualities available in desired finishes

A.W. CUT NAILS
Reading Brand
Black, Quenched and Tempered, Galvanized

MINE PRODUCTS
Iron Ore Concentrates, Sintered Concentrates, Crushed Stone, Grit, Sand and Engine Sand

COKE
Foundry, Industrial and Domestic

COAL CHEMICALS
Coke Oven Gas • Crude Coal Tar • Ammonium Sulphate • Industrial Benzol, Toluol, Xylol • Motor Benzol • Crude Solvent Naphtha • Crude Naphthalene • Crude Tar Bases • Sodium Phenolate • Crude Light Oil Still Residue

ALAN WOOD STEEL COMPANY

Conshohocken, Pa.

IVY ROCK, PA. • SWEDELAND, PA. • DOVER, N. J. • OXFORD, N. J.

Market Briefs

still rising — Industrial building costs are not leveling off, according to George A. Bryant, president, Austin Co. Lack of critical materials and the coming of winter can only bring an increase in unit costs, he warns. With so many products now unobtainable, alternate materials add to costs, either in purchase price or erection expenses. Lack of fourth quarter steel allocations to a number of defense projects is increasing their costs and delaying the release of experienced workers.

same supply — Straight chromium stainless steel strip for electric housewares manufacture will be available during first quarter 1952 in about the same amount as fourth-quarter 1951. But National Production Authority says it cannot estimate the supply beyond next March. All depends upon how much additional chromium production is needed during the second quarter for military and atomic energy requirements.

more freight cars—September new domestic freight car deliveries totaled 8533, according to American Railway Car Institute and Assn. of American Railroads. This is a sharp increase over the August figure of 7183, and reflects settlement of strikes which curtailed production. New orders of 9657 in September raised the backlog of cars on order to 140,135.

new records—Estimates indicate malleable founders will produce approximately 1 million tons of castings, an all-time high. Gray iron foundries are expected to produce at least 14 million tons, another all-time record. Steel foundries estimate 1951 shipments will be better than 2 million tons.

coating extras—Due to the 2¢ per lb increase in price of zinc, producers of galvanized pipe and sheets have increased coating extras to compensate. Increases are automatic under sliding scales. Pipe extras were increased $4 (2-points lower discount) on ½-in., ¾-in., and 1-in.; $3 (1½-points lower discount) on 1¼-in., 1½-in., and 2-in., and $2 (1-point lower discount) on 2½-in. or larger. Increases are subject to OPS approval.

rate increase — Iron and steel truckers have proposed a rate increase to become effective Dec. 1. Increase would mean 5 pct higher rates on 32,000 lb loads and 9 pct on 20,000 lb.

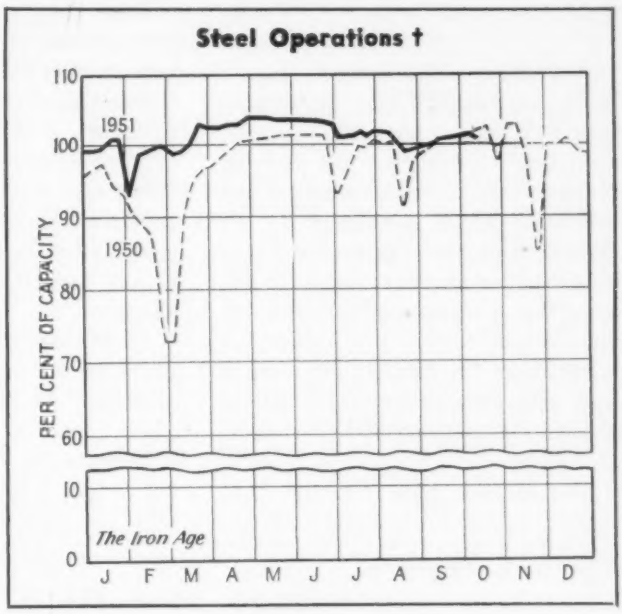
angles — Jones & Laughlin has indicated that they will begin rolling 6"x6" angles for the first time this next quarter. To date the largest size they have rolled has been a 5½" angle.

barge rate rise—For the first time in 5 years, the country's barge lines have increased their rates. Increase amounts to 9 pct east of the Mississippi and generally north of the Ohio and Potomac rivers, and 6 pct in other parts of the country. This is the same increase granted to railroads by the Interstate Commerce Commission under ex parte 175-A.

good business — Manufacturers' shipments and new orders in August expanded over seasonal levels, according to Commerce Dept.'s Office of Business Economics. Orders exceeded shipments for durable goods, but were less than shipments for nondurables. Inventory increases were confined to durable goods industries.

powdered iron — Ventures, Ltd., Toronto, is erecting a plant at Cap de Madelene, Que., for the production of powdered iron. The company has been successful in producing 2 tons of powdered iron daily in the test plant, and the new plant will have capacity of 10 tons per day.

cheap carbide — New metal carbide has been announced by Carboloy Dept., General Electric Co. With some properties superior to conventional carbides and substantially lower in cost, it is said to eliminate the need for tungsten and cobalt.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Sept. 30	100.0*	106.0	98.0*	101.0	104.0	104.0	100.0*	104.0	104.0	108.0	92.0	86.0	126.0	102.5
Oct. 7	100.0	107.0	95.0	101.0	103.0	104.0	101.0	103.0	104.0	104.0	93.0	95.0	126.0	101.5

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.
* Revised.

Operations Reduced by Alcoa

Metal shortage, Washington blamed . . . Bridgeport Brass puts faith in aluminum's future . . . Lead, zinc import ceilings hit by consumers . . . Silver down, bounces—*By Bob Hatschek.*

The long-range copper shortage was likened to the certainty of death and taxes in a recent statement by Manly Fleischmann, boss of the National Production Authority. As if to confirm this statement, Bridgeport Brass Co. announced entry into the aluminum fabrication business.

The 86-year-old company has been running experimental batches of aluminum and selling aluminum on a tryout basis for some time now and frankly acknowledges that the long-term prospects for copper and zinc supplies are poor enough to warrant taking on another line with a very bright future. They are not the first in the brass mill industry to make such a decision.

Aluminum Fabrication Cut—While aluminum's long-range picture is a very pretty one, Aluminum Co. of America has had to reduce some of its fabricating operations. Alcoa president I. W. Wilson lays the blame for these cuts on the current metal shortage, the government's orders to supply semi-finished aluminum to other firms for further processing and the government's efforts to change the pattern of business in aluminum.

Mr. Wilson also claimed that the Controlled Materials Plan could work far more efficiently if political pressures could be removed from its administrators.

Situation Improved — Rain and the prospect for greater than average rainfall in the Pacific Northwest have improved the power problem in that area. While aluminum production was lost, the whole situation is not deemed to be as serious as feared. The drought may even result in better handling of available power and will probably be the prime cause of accelerating the construction of new power plants in the Northwest.

Price Rhubarbs—Since Office of Price Stabilization upped the ceilings on domestic zinc and lead and slapped the same limit on imported metal, everyone has been calling for ceiling revisions on everything else from scrap to finished products. In many cases, such as brass, such increases will be necessary but OPS is moving slowly as usual.

As for some of the other items, pressure to increase prices only adds fuel to the inflation fire.

Imports to Drop — Another of the gripes leveled at OPS for setting the import ceilings is that import tonnages will drop. OPS was well aware of this when the ruling was issued, as was Defense Mobilizer Charles E. Wilson. However, Washington feeling was that domestic production would increase sufficiently to take up the slack.

Trouble is that it will take time to boost domestic output of these metals while consumers will find that the immediate availability will be off—and they need the zinc and lead now.

Scrap in Muddle — Meanwhile, chaos continues to dominate the metal scrap trade. Trade sources claim that many under-the-table deals are made with price laws frequently violated. It would admittedly be difficult for the government to police every transaction but the total of these dishonest deals adds up to quite a bit even though each one may be of small magnitude.

The industries largely dependent on scrap for their supplies of raw material are in desperate positions because of the shortage of scrap. While many people in industry do not like the idea of government controls, many have been heard to say that allocations of nonferrous scrap would be an aid in distribution. It certainly has proven itself worthwhile in iron and steel by coming through to keep furnaces going.

Silver Down, Up — Silver dropped 5.41¢ to 84.75¢ per oz last week because of a delay in the seasonal upturn of demand for the metal. Silverware manufacturers usually buy much more heavily at this time of the year in anticipation of Christmas. The following day saw the price bounce back 3.25¢ to 88¢ as a result of renewed interest. The London market followed the dip on Friday and also rebounded this Monday.

NONFERROUS METAL PRICES

	Oct. 3	Oct. 4	Oct. 5	Oct. 6	Oct. 8	Oct. 9
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.03	$1.03	$1.03	....	$1.03	$1.03*
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

*Tentative
Note: Quotations are going prices.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 3S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 53S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 37.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 34.2¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 75S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 75S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 34.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 28, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢; 5 to 13.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 34.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 36¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1-¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 10,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 5 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; ¾ to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 81¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b., mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks		53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.52	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$215-$221
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.03
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.29
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	32.25
No. 315	30.25
88-10-2 ingot	
No. 210	40.00
No. 215	38.50
No. 245	33.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	29.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.00
Grade 2—92-95%	17.75
Grade 3—90-92%	17.25
Grade 4—85-90%	16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow Brass	19½	17⅞
Red brass	20½	19⅜
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17¾
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14¾
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	10 —11

Zinc

New zinc clippings	12¼—12½
Old zinc	9 — 9¼
Zinc routings	5¾— 6
Old die cast scrap	5¾— 6

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	14 —14½
Battery plates (dry)	9½—10

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	48 —50
Mixed common babbitt	16¼—16½
Solder joints	23 —24
Siphon tops	48 —50
Small foundry type	20½—21
Monotype	18¼—18½
Lino. and stereotype	17½—18
Electrotype	15 —15½
Hand picked type shells	8¾— 9
Lino. and stereo. dross	8¾— 9
Electro. dross	5 — 5¼

Defense May Lower Calibre of Labor

Manpower troubles not serious problem now . . . Signs point instability of labor force and turnover . . . Defense work upgrades workers . . . Scrap stockpiles at danger point.

Although manpower is not yet a critical problem in scrap dealers' yards, the labor force is showing increasing instability and quickening turnover. Higher salaries, an opportunity to learn a skilled trade through industry schools, and more plentiful job opportunities, all stemming from defense production on the upsurge, portend labor trouble for the scrap trade.

Right now defense plants are harping on highly skilled labor. Except for several skilled occupations in certain areas, the labor force is adequate. It will be less so in the future and the scrap man's labor problems will multiply.

The scrap industry must face the fact that greater military output has an upgrading effect on labor. Thus quality of manpower coming to scrap yards for work may lower.

Some yards which have established a "family" atmosphere of labor relations will suffer less. Even these may lose a burner here and a craneman there. Reports from the New York area indicate that truck pickups have been thrown off-schedule in several instances because of job-hopping. The trouble goes deeper—into the preparation yard, too.

Scrap inventory is at a critical low and as one scrap man put it: "The mills are screaming louder." If the winter is severe it can hit at steelmaking in two ways — by freezing collections and shipments. Snarled up by freeze and snow, rail and water shipments could be delayed long enough to knock some major producers with a few days' supply into shutdowns. (See p. 58.)

NPA must have more agile distribution footwork and use more scrap collection persuasion to meet the extra needs of new capacity coming in. Some mills have been trying, not too successfully, to stockpile for expansion.

Pittsburgh—Scrap buyers here are living through some of their worst days. They not only lack enough of an inventory to carry them through the winter, but they are worrying about the requirements of new capacity. Stocks readily available are far from adequate. The fervent hope is for a mild winter.

Chicago—Mills here are more comfortable than a month ago but still worry about winter. Last week a considerable tonnage was allocated out of the district to Cleveland and the Valley. Mills are reported to be a little more particular in accepting scrap and won't pay over a $6 springboard unless tonnage is large. Competition is keen for locomotives and cars which are being prepared in transit.

Philadelphia—Mills in this district are getting practically all of their scrap on allocations while overgraded material is flowing consistently to the West. Some feel that combination of openhearth grades and reduction of premiums on foundry steel are being held up by influence of big users elsewhere. If premiums were cut on grades 20 and 21, legitimate users of these grades may be cut off sharply. Cast iron has shown the first signs of firming up and trading is more active.

New York—Waiting for openhearth grades amendments—strongly rumored as imminent but not showing up nevertheless—is making some dealers edgy. They don't know whether to delay allocations shipments and thus get in under new better price. Prompt action by OPS is needed. Cast may be a shade firmer. One reason given is that dealers are holding on to cast to wait for more favorable market.

Detroit—Market here is very quiet. With auto production cut back, manpower is not a serious problem in local scrap yards although there is the usual difficulty in getting the right kind of worker for the job. Deliveries of equipment to the yards—particularly cranes—is slow. All bundled scrap is being allocated.

Cleveland — Scrap traffic is unchanged. Cast grades are no longer as free as before. Heavy breakable grades are tighter. The hoped-for flow of dormant equipment from manufacturing plants is not showing itself in appreciable quantities, with only spotty reports of such scrap.

St. Louis—Excellent results from the automobile graveyards have not materialized. Dismantling cars has been slow. Movement of country scrap has also been disappointingly slow. Stocks in hands of yards here are down. Steel mill inventories are dwindling.

Birmingham—The scrap situation is little changed, but brokers and dealers who canvassed out-of-town suppliers in the last 10 days say they expect a pickup of scrap moving into the district by the middle of the month. Just how much this will help local users depends on what percentage is allocated mills in other sections.

Cincinnati—Every dealer has been given allocations for Newport, Ky., and Middletown, Ohio mills. Pressure has reportedly let up on foundry grades. There are fewer calls for daily deliveries. Claims that southern pipemakers may soon be buying cupola cast and stoveplate will end good foundry conditions if true. Autowreckers can't strip cars fast enough to keep up with the burners, it is reported.

Boston—It is the same old story here. Scrap is moving at a fast pace and cast grades are slightly behind in activity. Brokers say that the market continues at a very healthy pace with the likelihood that cast may soon be as active as scrap steel.

Buffalo—Mills report scrap receipts have dropped off considerably in last few weeks. Inventories are not quite as good as at same time last year. Shipments by water brought mixed material from Eastern Seaboard via canal and borings from Upper Lakes.

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →	$0.99	.75	.53	.65	.75	.51	.75	.51	.75	.70	.76	.83	.65	.26	1.34	.79	.50	.20	.51	.20	.52	.47	.51	.51	.51	.51	.66	.83	.53	.33	.67	.66	.83	.53	.33	.67
Basing Points →	Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Cal.	San Francisco	Seattle
GRADES OPS No.																																				
No. 1 heavy melting 1	$44.00							$44.00					$43.00				$42.50						$42.00				$41.00	$41.15	$40.00	$39.50	$39.00		$38.00	$37.00	$38.00	
No. 2 heavy melting 2	42.00							42.00					41.00				40.50						40.00				39.00	39.15	38.00	37.50	37.00		36.00	35.00	36.00	
No. 1 busheling 3	44.00							44.00					43.00				42.50						42.00				41.00	41.15	40.00	39.50	39.00		38.00	37.00	38.00	
No. 1 bundles 4	44.00							44.00					43.00				42.50						42.00				41.00	41.15	40.00	39.50	39.00		38.00	37.00	38.00	
No. 2 bundles 5	41.00							41.00					40.00				39.50						39.00				38.00	38.15	37.00	36.50	36.00		35.00	34.00	35.00	
Machine shop turnings 6	34.00							34.00					33.00				32.50						32.00				31.00	31.15	30.00	29.50	29.00		28.00	27.00	28.00	
Mixed borings and turnings 7	38.00							38.00					37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00		32.00	31.00	32.00	
Shovelling turnings 8	36.00							36.00					37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00		32.00	31.00	32.00	
Cast iron borings 10	38.00							38.00					37.00				36.50						36.00				35.00	35.15	34.00	33.50	33.00		32.00	31.00	32.00	
No. 1 chemical borings 26	41.00							41.00					40.00				39.50						39.00				38.00	38.15	37.00	36.50	36.00		35.00	34.00	35.00	
Forge crops 11	51.50							51.50					50.50				50.00						49.50				48.50	48.65	47.50	47.00	46.50		45.50	44.50	45.50	
Bar crops and plate 12	49.00							49.00					48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00		43.00	42.00	43.00	
Punchings and plate 14	46.50							46.50					45.50				45.00						44.50				43.50	43.65	42.50	42.00	41.50		40.50	39.50	40.50	
Electric furnace bundles 15	46.00							46.00					45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00		40.00	39.00	40.00	
Cut struct., plate, 3 ft and less 16	47.00							47.00					46.00				45.50						45.00				44.00	44.15	43.00	42.50	42.00		41.00	40.00	41.00	
Cut struct., plate, 2 ft and less 17	49.00							49.00					48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00		43.00	42.00	43.00	
Cut struct., plate, 1 ft and less 18	50.00							50.00					49.00				48.50						48.00				47.00	47.15	46.00	45.50	45.00		44.00	43.00	44.00	
Foundry steel, 2 ft and less 20	46.00							46.00					45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00		40.00	39.00	40.00	
Foundry steel, 1 ft and less 21	48.00							48.00					47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00		42.00	41.00	42.00	
Heavy trimmings 24	43.00							43.00					42.00				41.50						41.00				40.00	40.15	39.00	38.50	38.00		37.00	36.00	37.00	
No. 1 RR heavy melting RR 1	46.00							46.00					45.00				44.50						44.00				43.00	43.15	42.00	41.50	41.00		40.00	39.00	40.00	
Scrap rails, random lengths RR 14	48.00							48.00					47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00		42.00	41.00	42.00	
Scrap rails, 3 ft and less RR 16	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	45.00	
Scrap rails, 2 ft and less RR 17	52.00							52.00					51.00				50.50						50.00				49.00	49.15	48.00	47.50	47.00		46.00	45.00	46.00	
Scrap rails, 18 in. and less RR 18	54.00							54.00					53.00				52.50						52.00				51.00	51.15	50.00	49.50	49.00		48.00	47.00	48.00	
Rerolling rails RR 15	53.00							53.00					52.00				51.50						51.00				50.00	50.15	49.00	48.50	48.00		47.00	46.00	47.00	
Uncut tires RR 20	48.00							48.00					47.00				46.50						46.00				45.00	45.15	44.00	43.50	43.00		42.00	41.00	42.00	
Cut tires RR 21	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	45.00	
Cut bolsters and side frames RR 23	49.00							49.00					48.00				47.50						47.00				46.00	46.15	45.00	44.50	44.00		43.00	42.00	43.00	
RR specialties RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	45.00	
Solid steel axles RR 25	58.00							58.00					57.00				56.50						56.00				55.00	55.15	54.00	53.50	53.00		52.00	51.00	52.00	
No. 3 steel wheels RR 27	51.00							51.00					50.00				49.50						49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	45.00	

Cast Scrap

(*F.o.b. all shipping points*)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

Ceiling price of clean cast iron foundry runouts or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; **Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary.**

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum**; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese**; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon**: electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium**: $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys**; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and re-rolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 9 and 21 and cast grades, 1, 7, 9 and 11.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 3.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(*Consumers buying prices, del'd gross ton*)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	29.50
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	28.00
Mixed borings, turnings	28.00
Cast scrap	58.00 to 60.00

mill scale

use:

Mill Scale is an iron oxide that forms in heat treating operations when the ingot is rolled down to blooms, slabs, etc. High in iron content, Mill Scale is a desirable scrap charge for the Blast Furnace where it is reduced to metallic iron. Coarse scale from heavy rolling mills is most desirable and is obtained by rushing the slab into the roughing stand where water under high pressure removes the scale. This scale is almost pure iron oxide and can be charged directly into the furnace. Fine scale from finishing mills should generally be sintered before charging. Mill Scale is also used in the production of wrought iron as it provides oxygen to eliminate certain unneeded elements present in the pig iron.

source:

Rolling mills, forge shops and other heat treating operations.

specifications:

Mill Scale. Iron oxide produced by heat treating operations; containing not less than 65% metallic iron.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

PLANTS

LEBANON, PENNA.
READING, PENNA.
DETROIT (ECORSE), MICHIGAN
MODENA, PENNA.
PITTSBURGH, PENNA.
ERIE, PENNA.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Penna.

OFFICES

BIRMINGHAM, ALA. Empire Building	CHICAGO, ILLINOIS 100 W. Monroe St.	HOUSTON, TEXAS 1114 Texas Av. Bldg.	PITTSBURGH, PA. Oliver Building
BOSTON, MASS. Statler Building	CLEVELAND, OHIO 1022 Midland Bldg.	LEBANON, PENNA. Luria Building	PUEBLO, COLORADO 334 Colorado Bldg.
BUFFALO, N. Y. Genesee Building	DETROIT, MICHIGAN 2011 Book Building	NEW YORK, N. Y. 100 Park Avenue	READING, PENNA. Luria Building

ST. LOUIS, MISSOURI
2052 Railway Exchange Bldg.

SAN FRANCISCO, CALIFORNIA
Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Oct. 9, 1951	Oct. 2, 1951	Sept. 11, 1951	Oct. 10 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip(No. 302)	36.75	36.75	36.75	34.50
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No.302)	31.50	31.50	31.50	30.00
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Oct. 9, 1951	Oct. 2, 1951	Sept. 11, 1951	Oct. 10 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$51.76
No. 2, Valley furnace	52.50	52.50	52.50	49.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	52.58
No. 2, Birmingham	48.88	48.88	48.88	45.88
No. 2, foundry, Chicago†	52.50	52.50	52.50	49.50
Basic del'd Philadelphia	56.92	56.92	56.92	50.92
Basic, Valley furnace	52.00	52.00	52.00	49.00
Malleable, Chicago†	52.50	52.50	52.50	49.50
Malleable, Valley	52.50	52.50	52.50	49.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.00*	$44.00*	$44.00*	$43.75
No. 1 steel, Phila. area	42.50*	42.50*	42.50*	38.50
No. 1 steel, Chicago	42.50*	42.50*	42.50*	39.75
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	37.25
Low phos. Young'n	46.50*	46.50*	46.50*	46.25
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	53.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	50.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	50.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.03†	$1.03	$1.03	$1.115
Zinc, East St. Louis	19.50	19.50	17.50	17.50
Lead, St. Louis	18.80	18.80	16.80	15.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	51.22
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	32.00

†Tentative.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Oct. 9, 1951	4.131¢ per lb.	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One year ago	3.837¢ per lb.	49.19 per gross ton	40.67 per gross ton

	Finished Steel Base Price				Pig Iron				Scrap Steel			
	High		Low		High		Low		High		Low	
1951	4.131¢	Jan. 2	4.131¢	Jan. 2	$52.69	Jan. 2	$52.69	Jan. 2	$47.75	Jan. 30	$43.00	Feb. 7
1950	4.131¢	Dec. 1	3.837¢	Jan. 3	52.69	Dec. 12	45.88	Jan. 3	45.13	Dec. 19	26.25	Jan. 3
1949	3.837¢	Dec. 27	3.3705¢	May 3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	32.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1932	1.89196¢	July 5	1.83910¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 9

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 18, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in those areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[11]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$68.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[11]
Alloy, net ton	$70.00[1,17,6]	$70.00[1,4]	$70.00[1,6]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$72.00[11]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]		4.10[3,5]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[5,23]	3.60[1,6,9]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]	4.30[22]	3.80[11] 4.40[17]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]	5.05[22]	4.55[12]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[64]					4.80[3]	5.50[22]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[6]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90		5.40[3]	5.65[26]		5.40[3]		5.95[12]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[12]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[11,58], 3.75[28] 3.50[5,7]	3.50[66]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[17] 3.80[12]
Cold-rolled	4.65[5,7,9] 5.00[28] 5.35[10,63,58]	4.90[8,66]	4.90[8]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[48,49] 5.35[13,40]		4.65[3]			4.65[3]		4.85[12] 5.45[47] 5.60[58,63]
Hi str. low alloy, h.r.	5.79[9]		5.50[1] 5.30[8,5],80[6]				4.95[4], 5.50[1] 5.40[13], 5.80[6]		4.95[3]	5.55[26]		4.95[2]		5.95[12]
Hi str. low alloy, c.r.	7.20[9]			6.55[2] 6.70[5]			6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[22] 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,23]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[11] 4.80[106]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4,6]		3.70[3,6]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,23,70]	4.55[4,74,73]	4.55[2]	4.55[4,82]		4.55[6,57]		4.60[70]					4.70[84]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,23]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[8]	4.30[6,4]		4.30[3]			4.45[11] 4.85[12]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,23,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,82]		5.40[6,25,57]	5.40[3]	5.40[3]					5.55[84] 5.60[106]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[6]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,23]	3.70[1,6,8]	3.70[4,5]			3.70[1,4,5] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[8]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8] 6.15[6]	5.65[4,5]			5.65[4] 5.70[13] 6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,23]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[18]	4.85[2] 4.33,34		4.85[2]			4.85[6]	Kokomo = 4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth = 4.85[2]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$62.90[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$68.00[11]	F=$85.00[19] SF, LS, S=$85.00[62]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[62]		Alloy net ton
				Alton=4.40[32] Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[20]	PIPE SKELP
	4.50[83]	4.10[4-11]	SF=4.90[2], F=4.90[19] LA=4.90[24-62]		WIRE RODS
		3.60[4-11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[64], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4-11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4-11]	SF, LA=4.25[24-62] F=4.75[19], S=4.50[62]	Alton=3.95[32] Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[2], 5.85[68] Trenton=6.00[15]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[62] S=6.30[62]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		8.55[11]	SF=9.20[24]		TINPLATE Cokes 1.25-lb base box (1.50 lb. add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4-11]	SF, LA=4.40[24]	Alton=4.15[32] Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.35[83]	4.10[83]	3.70[4-11]	SF, S=4.45[62] F=4.40[19], LA=4.40[62]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[62] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19], SF, S=6.30[62] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4-11]	F=4.30[19] S=4.60[62]	Claymont=4.15[29] Coatesville=4.15[21] Harrisburg=6.75[35] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=6.75[35]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19] S=6.55[62]	Geneva=5.65[16]	Hi str. low alloy
4.20[11]	4.05[83]	3.60[3] 3.65[11]	SF=4.20[62] F=4.25[16] LA=4.25[24-62] S=4.30[62]	Geneva 3.65[16] Minnequa 4.10[14] Phoenixville=6.25[56]	SHAPES, Structural
		5.50[11]	SF=6.10[62-19] SF=6.00[62] LA=6.05[62]	Geneva=5.50[16] Alton=5.05[32] Atlanta=5.10[65] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[20]	Si str. low alloy
5.45[83]	5.25[83]	4.85[4-11]	SF, LA=5.80[24]		MANUFACTURERS' WIRE Bright

† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128-lb. deduct $2.20 from 1.25-lb coke base box.

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calstrip Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., Alton, Ill.
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide, McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel, San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.
105 Tonawanda Iron Div., N. Tonawanda, N. Y.
106 Pilgrim Drawn Steel Div., Automotive Materials Corp., Plymouth, Mich.

Steel Prices

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50*	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	26.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 4, 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind, 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 4, 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13 (type 301 add ¼¢); Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

*ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 Series.

WASHINGTON STEEL—Slightly lower on 300 Series except where noted.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Gal. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Gal. (1) ¢/lb.
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa.-5	118	132	....	....	136	140	5.70	6.15
Atlanta-65	121	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	....	123	143	143	5.70	6.15
Buffalo-85	....	....	....	....	....	....	4.85	....
Cleveland-86	125	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	140	140	5.70	6.15
Duluth-2	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	140	5.70	6.15
Houston-83	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	142	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	....	....	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	136	....	....	....	....	....
Pittsburg, Cal.-24	137	....	....	147	156	160	6.65	6.80
Portsmouth-20	124	137	....	....	....	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	....	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	....	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va., (15), $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago.	$105.30 to $108.80
6 to 24-in., del'd N. Y.	108.50 to 109.50
6 to 24-in., Birmingham.	91.50 to 96.00
6-in and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track bolts Treated
Bessemer-1	3.60	4.00	4.70	....	....	....	....	....
Chicago-4	....	....	....	6.15	....	....	....	....
Ensley-11	3.60	4.00	....	....	....	....	....	....
Fairfield-11	....	4.00	4.40	....	....	8.80	4.50	....
Gary-1	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor-8	3.60	....	4.70	6.15	5.60	8.80	4.50	....
Johnstown-3	....	4.00	....	....	5.60	8.80	....	....
Joliet-1	....	4.00	4.70	....	....	....	....	....
Kansas City-83	....	....	....	6.40	....	....	....	9.85
Lackawanna-3	3.60	4.00	4.70	....	....	8.80	4.50	....
Lebanon-3	....	....	....	6.15	....	....	....	9.85
Minnequa-14	3.60	4.50	4.70	6.15	....	8.80	4.50	9.85
Pittsburgh-77	....	....	....	....	....	9.35	....	9.85
Pittsburgh-78	....	....	....	....	....	....	....	9.85
Pittsburgh-5	....	....	....	6.15	....	....	....	....
Pittsburgh-24	....	....	....	....	....	....	4.65	....
Seattle-62	....	....	....	6.65	....	....	4.65	....
Steelton-3	3.60	....	4.70	....	....	....	4.50	....
Struthers-6	....	....	....	6.15	....	....	....	....
Terrance-24	....	....	....	....	....	....	4.65	....
Youngstown-4	....	....	....	6.15	....	....	....	....

BOILER TUBES

$ Per 100 ft., cut, 10 to 24 ft

F.o.b. Mill	Size OD-in.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	30.48	35.84	29.57	34.78
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.88	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48	....	....
	2½	12	29.65	36.32	....	....
	3	12	34.00	41.64	....	....
	3½	11	40.34	49.41	....	....
	4	10	51.21	62.72	....	....
Pittsburgh Steel	2	13	....	27.08	....	....
	2½	12	30.49	37.15	....	....
	3	12	34.95	42.59	....	....
	3½	11	41.48	50.54	....	....
	4	10	52.65	64.16	....	....

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

70% or more	$43.00
60% or less	40.00

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	3½-4 In. Blk.	3½-4 In. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	10.0	37.0	14.0	39.5	17.5	40.0	18.5	40.5	19.5	41.0	20.0	41.5	21.0						
Cleveland-4	36.0	12.0	39.0	16.0	41.5	19.5	42.9	20.5	42.5	21.5	43.0	22.0	43.5	23.0						
Oakland-19	25.0	1.0	28.0	5.0	30.5	8.5	31.0	9.5	31.5	10.5	32.0	11.0	32.5	12.0						
Pittsburgh-5	36.0	12.0	39.0	15.0	41.5	17.5	42.0	19.0	42.5	19.5	43.0	20.0	43.5	21.5	29.5	6.5	32.5	10.5	34.5	12.5
Pittsburgh-10	36.0	12.0	39.0	16.0	41.5	19.5	42.0	20.5	42.5	21.5	43.0	22.0	43.5	23.0	29.5	8.0	32.5	11.5	34.5	13.5
Alton, Ill.-32	35.0	11.0	38.0	17.0	40.5	18.5	41.0	19.5	41.5	20.5	42.0	21.0	42.5	22.0						
Sharon-90	36.0	11.0	39.0	17.0	41.5	18.0	42.0	19.0	42.5	19.5	43.0	20.0	43.5	21.0						
Pittsburgh-88	36.0	12.0	39.0	16.0	41.5	19.5	42.0	20.5	42.5	21.5	43.0	22.0	43.5	23.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	12.0	39.0	16.0	41.5	19.5	42.0	20.5	42.5	21.5	43.0	22.0	43.5	23.0	....	....	....	....	....	....
Wheatland-89	36.0	12.0	39.0	15.0	41.5	17.5	42.0	19.0	42.5	19.5	43.0	20.0	43.5	21.5	....	....	....	....	....	....
Youngstown-6	36.0	12.0	39.0	16.0	41.5	19.5	42.0	20.5	42.5	21.5	43.0	22.0	43.5	23.0	29.5	8.0	32.5	11.5	34.5	13.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	11.0	37.5	15.0	39.5	18.5	40.0	19.5	40.5	20.5	41.0	21.0	41.5	22.0						
Cleveland-4	35.5	13.0	39.5	17.0	41.5	20.5	42.0	21.5	42.5	22.5	43.0	23.0	43.5	24.0						
Oakland-19	24.5	2.0	28.5	6.0	30.5	9.5	31.0	10.5	31.5	11.5	32.0	12.0	32.5	13.0						
Pittsburgh-5	35.5	11.5	39.5	15.5	41.5	17.5	42.0	19.0	42.5	19.5	43.0	20.0	43.5	21.5	29.0	6.0	33.0	11.0	36.5	14.5
Pittsburgh-10	35.5	13.0	39.5	17.0	41.5	20.5	42.0	21.5	42.5	22.5	43.0	23.0	43.5	24.0	29.0	8.5	33.0	13.0	36.5	16.5
Alton, Ill.-32	32.5	10.0	36.5	14.0	38.5	17.5	39.0	18.5	39.5	19.5	40.0	20.0	40.5	21.0						
Sharon-90	35.5	12.0	39.5	16.0	41.5	19.0	42.0	20.0	42.5	20.5	43.0	21.0	43.5	22.0						
Pittsburgh-88	35.5	13.0	39.5	17.0	41.5	20.5	42.0	21.5	42.5	22.5	43.0	23.0	43.5	24.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	13.0	39.5	17.0	41.5	20.5	42.0	21.5	42.5	22.5	43.0	23.0	43.5	24.0	....	....	....	....	....	....
Wheatland-89	35.5	11.5	39.5	15.5	41.5	17.5	42.0	19.0	42.5	19.5	43.0	20.0	43.5	21.5	....	....	....	....	....	....
Youngstown-6	35.5	13.0	39.5	17.0	41.5	20.5	42.0	21.5	42.5	22.5	43.0	23.0	43.5	25.0	29.0	8.5	33.0	13.0	36.5	16.5

*Galvanized discounts based on zinc at 19¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes is.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. Galv. pipe changes this issue subject to OPS approval.

Miscellaneous Prices

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.67	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[4]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.06–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.89–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	6.55	6.15	9.80	10.10	11.45	11.75
Portland	6.66–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.95[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	57.00	57.50	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-28	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....
N. Tonawanda, N. Y.-105	.....	52.50	53.00	.....	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct, except low phos. 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferroalloy prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick (*F.o.b. works*) *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.75

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*) *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.85
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.85
Cleveland-2	4.65	6.45	7.40	9.35	11.85
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.85
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.85
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.85
Youngstown-48	.....	6.80	7.40	9.35	11.85

Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List	
	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List			
	Less Keg	K.	Less Keg	K.
	Reg.		Hvy.	
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & Smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb.
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(*In bulk*)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b., mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*27.50
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	$81.0
6	4	2	6	—	96.5¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, In East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd.	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15		7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28		7.25	8.50	9.30	9.85		
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22		7.95	9.20				
Ind. Harbor-3	6.75	7.25					
Mansfield-75	7.25	7.75	9.00	9.80			
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.50

Foundry Ferrochrome

Contract prices, cents per lb of alloy. Noncontract prices add 2.50¢ per lb.

High carbon 8 mesh and down.

62 to 66% Cr, 5 to 7% C, 7 to 10% Si.

Carloads, bulk	22.25
Carloads, packed	24.15
Ton lots, packed	27.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.14
0.50% max. C.	1.10
9 to 11% C.	1.09

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.5¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

Ferrosilloy Prices

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55

Briquet, contract basis carlots, bulk delivered, per lb of briquet

	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd. Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

—Miscellaneous Prices—

Ferroalloy Prices (*continued*)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
- Carload ..... 9.90¢
- Ton lots ..... 11.30¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
- Ton lots $4.90
- Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
- 10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max. f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
- Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
- Openhearth ..... $3.00-$3.10
- Crucible 3.10- 3.20
- High speed steel (Primos) 3.20- 3.35

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
- bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk lump ..... 14.50¢
- Ton lots, bulk lump ..... 15.75¢
- Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15% contract basis, lump, delivered, per lb of alloy.
- Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound ..... 45¢
- Less ton lots, per pound .... 80¢

Carbortam, Ti, 15-21% B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
- Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.30
F.o.b. Wash., Pa.; 100 lb up
- 10 to 14% B..... .85
- 14 to 19% B..... 1.20
- 19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
- No. 1 ..... $1.00
- No. 6 ..... 65¢
- No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
- Ton lots $1.40
- Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered. *$1.95
- Less ton lots ..... *

Silcaz, contract basis, delivered.
- Ton lots ..... 45.00¢